Impact of Canadian Ethanol Policy on Canada's Livestock and Meat Industry 2012

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January 2012

Presented to

Canadian Cattlemen's Association
Canadian Pork Council
Canadian Meat Council

Executive Summary

The federal government in Canada and provincial governments have developed policies for biofuels as part of a green fuels strategy to reduce petroleum fuel consumption and associated emissions. To date, the anchor of biofuel policy initiatives has been ethanol made from corn in eastern Canada and made from wheat in western Canada. At least $250 million is spent annually by federal and provincial governments to provide financial support to the ethanol industry. The financial support takes the form of capital and operating subsidies to ethanol operations and firms. In addition, the industry is supported by mandates at the federal and provincial level that dictate ethanol usage in gasoline. Finally, the industry is protected from foreign competition through a tariff.

This study develops a comprehensive understanding of the prospective impact that federal and provincial ethanol policies have on the Canadian livestock industry. It is expected that this research will help governments assess the merits of forthcoming ethanol policy strategies.

The ethanol industry has become a major user of grains in Canada. This has not occurred in a vacuum. It is generating consequences that could be predicted by economic theory. That is, this industry that is created by government policy results in a stimulant to local Canadian grain demand and higher local grain prices than would have otherwise been the case. In addition, due to government subsidies, the ethanol industry has an advantage in the competition for feed grains relative to other buyers, such as the livestock industry. Most importantly the government mandated use of ethanol, currently at 5% of gasoline, creates an inflated demand for the product. As a result, ethanol policy has had impacts on the Canadian grain markets and on other users of grain, such as the Canadian livestock and meat industry.

It is acknowledged that over the past five years, the cattle and hog industries in Canada have undergone a great deal of financial stress. The Canadian dollar appreciation, the increase in global grain prices, animal health challenges and trade disputes have all negatively impacted the industry. As a result of these challenges, there is a tendency to overlook the impact of Canadian ethanol policies. It is also argued that the ethanol policies of the US are much more important to Canadian grain prices. This paper, however, makes the case that Canadian ethanol production and policies have a very crucial role in local grain prices. As a result of ethanol's local impact on grain prices, there is a related impact on local Canadian livestock and meat production prospects. Again, there are many factors that influence grain and livestock prices. This paper argues, however, that Canadian ethanol policies also have a direct and important negative influence on the Canadian livestock industry.

The data and statistical analysis in this report back up the theory and common sense assertions of the impact of ethanol on livestock production in Canada. The data show the following:

- Canadian ethanol production increases the price of feed grains in eastern and western Canada by about $15-20/tonne and $5-10/tonne respectively.
- Canadian ethanol production resulted in reduction in livestock feeding margins and or increased losses for Canadian producers amounting to about $130 million per year.

- Canadian ethanol production resulted in lower feeder livestock prices for Canadian producers.
- Canadian ethanol production resulted in increased exports of feeder animals that could have been fed by Canadian producers.
- Canadian ethanol production resulted in reduced incentives for livestock production in Canada.
- Expanded use of ethanol to a 10% mandate will result in a serious reduction in feed availability in eastern Canada. This will result in a dramatic reduction of cattle and hog feeding in eastern Canada.

The bottom line is that ethanol has already contributed to the downsizing of the Canadian livestock industry through its impact on margins and livestock prices. Expansion of the ethanol industry will amplify the negative consequences.

Arguments have been made that given relatively lower grain prices in Ontario and the West compared to the US during 2010 and 2011, that ethanol is not a threat to livestock. This argument, however, is simply based on a fortuitous increase in production relative to demand in Canada compared to the US. Furthermore, even in these circumstances, the data and economic theory still demonstrate a negative livestock impact. That is, a point in time argument does not outweigh the ongoing impact of ethanol locally in Canada.

It is important to once again emphasize that the strengthening in the grain basis due to Canadian ethanol policy, rather than the world price of grain, is the driver of these developments. Ethanol policy in Canada, not the US policy, is having and will have far-reaching effects in terms of adjustments in the location of livestock feeding and meat production, and the associated economic development associated with them.

As biofuel policy evolves it is important that governments and industry understand these implications on livestock and meat development. Looking to the future, it is crucial for the livestock and meat industry that the policies and programs sustaining the ethanol industry be curtailed or eliminated. Most importantly, the federal government needs to carefully weigh the impact of allowing the ethanol industry to move to a 10% blended mandate. Furthermore, federal and provincial programs that provide capital grants for additional plants and capacity in the industry need to be reconsidered. Governments must recognize the significance of the Canadian livestock and meat industry, and that it is vulnerable to expansions in ethanol policy.

Government has demonstrated that in a short time, it can create a large ethanol industry. The same cannot be said for the livestock and meat industry. Governments must realize that once the red meat industry develops over a long period of time; if it were to drastically decline or vanish in some regions, it would take a very long time to return.

Répercussions de la politique canadienne relative à l'éthanol sur le secteur de l'élevage au Canada - 2012

Sommaire

Le gouvernement fédéral du Canada et les gouvernements provinciaux se sont dotés de politiques sur les biocarburants dans le cadre de stratégies sur les combustibles verts, en vue de réduire la consommation de carburant à base de pétrole et les émissions qui y sont associées. Jusqu'à maintenant, les politiques sur les biocarburants ont été axées sur l'éthanol produit à partir du maïs dans l'Est du Canada, et du blé dans l'Ouest canadien. Au moins 250 millions de dollars sont dépensés annuellement par le fédéral et les gouvernements provinciaux pour soutenir financièrement l'industrie de l'éthanol. Cette aide est accordée sous forme de subventions d'immobilisation et d'exploitation aux usines d'éthanol et aux entreprises. De plus, l'industrie est soutenue par des directives fédérales et provinciales qui prescrivent l'utilisation d'éthanol dans l'essence. Enfin, des tarifs protègent l'industrie de l'éthanol de la concurrence étrangère.

La présente étude a pour objectif de présenter une vue d'ensemble des effets potentiels des politiques fédérales et provinciales relatives à l'éthanol sur le secteur canadien de l'élevage. Nous espérons que cette recherche sera utile aux gouvernements dans le cadre de leur évaluation des prochaines stratégies concernant l'éthanol.

L'industrie de l'éthanol est devenue un utilisateur important des grains produits au Canada. Il ne s'agit pas d'un phénomène isolé. La production d'éthanol a des conséquences qui auraient pu être prévues sur le plan économique. Cette industrie, créée par des politiques gouvernementales, a stimulé la demande canadienne locale de grains et fait augmenter le prix de ces derniers. De plus, en raison des subventions gouvernementales, l'industrie de l'éthanol détient un avantage concurrentiel sur le marché des grains fourragers comparativement aux autres acheteurs, comme le secteur de l'élevage. Et, ce qui est encore plus important, l'utilisation de 5 % d'éthanol dans l'essence, prescrite par le gouvernement, a gonflé la demande pour ce produit. La politique sur l'éthanol a donc eu une incidence sur les marchés céréaliers canadiens et sur les autres utilisateurs de grains, comme les secteurs de l'élevage et des viandes du Canada.

On sait que les secteurs bovin et porcin au Canada ont traversé une grave crise financière au cours des cinq dernières années. La hausse de la devise canadienne, l'augmentation générale du prix des grains, les problèmes en santé animale et les différends commerciaux ont tous eu des répercussions négatives sur l'industrie de l'élevage. Ces difficultés ont en quelque sorte contribué à masquer l'ampleur de l'effet des politiques canadiennes sur l'éthanol. Par ailleurs, certains estiment que les politiques américaines sur l'éthanol ont beaucoup plus d'effet sur les prix canadiens des céréales. Cette étude montre au contraire que la production canadienne d'éthanol et les politiques du Canada à ce chapitre jouent un rôle déterminant sur les prix canadiens des céréales. En raison de l'incidence de l'éthanol sur les prix locaux, l'évolution de cette industrie a donc des répercussions sur les perspectives canadiennes en matière d'élevage et de production de viande. Ici encore, rappelons que de nombreux facteurs exercent un effet sur les prix des grains et des animaux d'élevage. Nous estimons toutefois que les politiques canadiennes en matière d'éthanol ont un impact direct majeur sur l'industrie canadienne de l'élevage.

Les données et l'analyse statistique présentées dans ce rapport confirment la théorie et le simple bon sens, selon lesquels la production d'éthanol a des répercussions sur le secteur canadien de l'élevage. Ainsi,

- la production canadienne d'éthanol a fait augmenter le prix des grains fourragers dans l'Est et l'Ouest du Canada d'environ 15 à 20 $/tonne et de 5 à10 $/tonne respectivement;
- la production canadienne d'éthanol a entraîné une réduction des marges de profit dans le secteur de l'élevage ou une hausse des pertes pour les producteurs canadiens d'environ 130 millions de dollars par année;
- la production canadienne d'éthanol a fait baisser les prix des animaux d'engraissement pour les producteurs canadiens;
- la production canadienne d'éthanol a fait augmenter les exportations d'animaux d'engraissement qui auraient pu être finis par des producteurs canadiens;
- la production canadienne d'éthanol a été dissuasive pour la production d'animaux d'élevage au Canada;
- l'utilisation accrue d'éthanol pour atteindre 10 % dans l'essence diminuera lourdement l'accès aux grains fourragers dans l'Est du Canada, entraînant une baisse radicale de la production de bovins et de porcs d'engraissement dans l'Est du pays.

En fait, l'éthanol a déjà contribué à réduire l'industrie de l'élevage au Canada en raison de son impact sur les marges des producteurs et sur les prix du bétail. L'expansion de l'industrie de l'éthanol va amplifier davantage ces conséquences négatives.

Certains avancent que l'éthanol ne menace pas le secteur de l'élevage, étant donné les prix relativement bas des grains en Ontario et dans l'Ouest, comparativement à ceux des États-Unis en 2010 et 2011. Cet argument, toutefois, est uniquement basé sur une hausse fortuite de la production relativement à la demande au Canada, comparativement aux États-Unis. De plus, même dans ces circonstances, les données et la théorie économique confirment l'effet négatif de l'éthanol sur le secteur de l'élevage. Un argument ponctuel ne peut de toute façon avoir plus de poids que l'impact constant de la production locale d'éthanol au Canada.

Rappelons de nouveau que c'est surtout en raison de la politique canadienne sur l'éthanol que le secteur céréalier a prix de l'expansion bien plus qu'à cause des prix mondiaux des grains. La politique sur l'éthanol du Canada, et non pas celle des États-Unis, est et continuera d'être lourde de conséquences sur l'emplacement géographique de l'engraissement du bétail et de la production de viande ainsi que sur le développement économique associé à ces activités.

À mesure que les politiques sur les biocarburants évoluent, il est important que les gouvernements et l'industrie comprennent bien les retombées de ces dernières sur le développement des secteurs de l'élevage et de la viande. Il est essentiel pour l'avenir de ces secteurs que les politiques et les programmes soutenant l'industrie de l'éthanol soient freinés ou éliminés. Il est également très important que le gouvernement fédéral évalue attentivement l'impact de permettre à l'industrie de passer à un pourcentage de 10 % d'éthanol dans l'essence. De plus, les programmes fédéraux et provinciaux qui accordent des subventions pour accroitre le nombre d'usines et la capacité de l'industrie doivent être réexaminés. Les gouvernements doivent

reconnaître l'importance de l'industrie canadienne de l'élevage et de la viande ainsi que le fait que ces secteurs sont vulnérables à une expansion des politiques sur l'éthanol.

Le gouvernement a démontré qu'il peut mettre en place, en peu de temps, une vaste industrie de l'éthanol. On ne peut pas dire la même chose de l'élevage et de l'industrie de la viande. Les gouvernements doivent se rendre compte que le secteur des viandes rouges s'est développé sur une longue période de temps. S'il fallait qu'il décline ou qu'il disparaisse rapidement, il faudrait beaucoup de temps pour le rebâtir.

George Morris Centre
January 2012

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1.0 Introduction

The federal government in Canada and provincial governments have developed policies for biofuels as part of a green fuels strategy to reduce petroleum fuel consumption and associated emissions. To date, the anchor of biofuel policy initiatives has been ethanol made from corn in eastern Canada and made from wheat in western Canada. At least $250 million is spent annually by federal and provincial governments to provide financial support to the ethanol industry. The financial support takes the form of capital and operating subsidies to ethanol operations and firms. In addition, the industry is supported by mandates at the federal and provincial level that dictate ethanol usage in gasoline. Finally, the industry is protected from foreign competition through a tariff. Appendix A provides an over view of federal and provincial government support for the industry in Canada.

Feed grains are the primary input of the livestock industry, which in turn is the primary input of the meat industry. Thus, ethanol competes with the livestock/meat segment for this critical input. The insertion of a subsidized competitor into the feed grain market stands to have a profound influence in the Canadian livestock and meat industry. As biofuel policy evolves it is important that governments and industry understand these implications on livestock and meat development.

1.1.1 Project Purpose

This study develops a comprehensive understanding of the prospective impact that federal and provincial ethanol policies have on the Canadian livestock industry. It is expected that this research will help governments assess the merits of forthcoming ethanol policy strategies.

Full understanding of the impact must include an examination of the five following topics, which are each addressed in the paper.

1. Examine the impact of local and regional factors on the pricing of livestock and feed grain.
2. Determine the implications of local pricing factors as drivers for local and regional livestock and feed grain sectors.
3. Determine the impact that Canadian ethanol policy and grain demand has on regional or local grain prices.
4. Determine the impact of ethanol policy on the Canadian regional livestock sectors
5. Contrast the dynamics of the livestock and meat industry versus the ethanol industry.

1.1.2 Findings Synopsis

This paper finds that Canadian ethanol production increases the price of feed grains in eastern and western Canada. As a result of these increases, it results in a reduction in livestock feeding margins and or increased losses for Canadian producers. The data also demonstrate that Canadian ethanol production resulted in lower feeder livestock prices for Canadian producers and ultimately in reduced incentives for livestock production in Canada. The study also asserts that expanded use of ethanol will result in a serious reduction in feed availability in eastern Canada. This will result in a dramatic reduction of cattle and hog feeding in eastern Canada.

In order to generate the findings, the study examines the theory and methodology of price discovery and livestock production. The paper also describes the drivers and factors that impact livestock and grain pricing. The paper then examines the impact of ethanol on grain prices and then ultimately on livestock prices and production. The impact of expanded ethanol production is also explored.

A key to this paper is the importance of local conditions and therefore Canadian ethanol policy. It is acknowledged that US ethanol policy is also a key price maker, but the main premise of this paper is that Canadian policy is just as important. The prominence of Canadian policy is too often ignored or not considered as being of significance.

The paper begins by examining how prices are arrived at in Canada and then delves into the grain and livestock specifics.

2.0 Grain Corn Prices and Price Spreads

This section of the report provides an overview of relative pricing, price spreads and basis between the United States and Canada. This section will describe what the grain basis is and its importance in price discovery for livestock. The section provides the conceptual framework to illustrate that local Canadian conditions are important drivers of the Canadian grain basis. The conceptual discussion then goes on to demonstrate how local grain market conditions therefore ultimately impact the fortunes of the livestock and meat industry in Canada.

2.1 Canadian Price Discovery

Two leading US livestock economists, Clem Ward of Oklahoma State and Ted Schroeder of Kansas State assert that, in agricultural commodity markets, there are two overall concepts that help to frame a discussion of how prices are arrived at in any given region or any given transaction. One of the concepts is "price determination", which refers to the big picture or overall price levels for a commodity. The other concept is "price discovery", which pertains to how an individual farm or firm arrives at a transaction price.

2.1.1 US or Global Price Starting Point

For Canadian agricultural producers, price determination involves global, but mostly US, supply and demand forces. These forces, such as inventories, production, competing prices, consumption and trade come into play to determine a base price level. That is, the global and US forces of supply and demand combine to determine an overall price level or trading range for agricultural commodities, either livestock or crops. That overall price level is ultimately expressed as a representative US price range for either livestock or crops. This representative price might take the form of a futures contract or a regional price such as Omaha corn, Amarillo feeder cattle or Iowa-Southern Minnesota hogs. In other words, Canadian producers can see the overall price level for products by accessing futures prices or USDA quotes for various regions.

With regard to price discovery, it is more of a micro or transactional concept. The following basic formula typically describes for the buyer-seller transaction and interplay in Canada:

Canadian price = US Price ÷ US¢/Canada Exchange Rate – Spread or basis

The fundamental final price is going to look very similar to the basic formula, whether the price agreed to between buyers and sellers is a formula price for a contract or whether it is a spot market negotiation.

The US price for the discovery process in Canada can be any US regional price, national price or futures contract. The US price chosen is often referred to as a "reference price." In any event, the US price is the starting point of the formula between buyer and seller within Canada.

2.1.2 Exchange Rate

The next component of the pricing process for agricultural commodities in Canada is the Canada/US exchange rate. It is a central and direct impact component of pricing. As the exchange rate appreciates, prices decrease and vice versa. Changes in the exchange rate are usually immediately reflected in changing agricultural commodity price levels in Canada. Canadian buyers and sellers react immediately to changes in the exchange rate by changing domestic bid and ask price levels to reflect the change.

2.1.3 Spread and Basis

The starting point in formula and negotiated pricing is the exchange rate adjusted US price. The US price and the exchange rate are readily available and can be used to determine a starting point Canadian equivalent price. After that, local conditions take over. Local conditions are quantified in the price spread or basis.

The price spread is the difference in price between two geographic regions, whereas the basis is the difference in price between a geographic region and a futures contract. The two terms, basis and spread, are often used interchangeably by industry participants. For the purposes of this study, "basis" will be used to describe the difference between the price in one region and the corresponding Chicago Mercantile or Chicago Board of Trade futures price. The term "spread" will be used to describe the difference between geographic regions, such as Ontario and Illinois.

Regions across Canada generally have greater livestock or grain supplies than domestic demand for those products. These regions of greater supply than demand are referred to being on an export basis. At the most basic level being on an export basis means that the pricing in these regions is generally lower than in those regions that are on an import basis.

Export basis pricing in a region in Canada is equal to the US price, adjusted for the exchange rate less the cost of moving the commodity to an alternative region in the United States. Canadian livestock and grain buyers will only pay what the seller's alternative market is offering, less the cost of moving the commodity to that alternative market. At its most basic level, the spread or basis is the cost of transport and logistics (customs and inspections) for moving livestock from a Canadian region to the US alternative market. For a region on an import basis, the arithmetic would be the same, except the price would be higher by the cost of transport into the region from the US.

A region like Ontario can be both on an import and an export basis for corn at different times during the year. In the province, exports and imports occur all the time, 12 months of the year. More emphasis is on export (export basis) in late fall, winter, and early spring. The imports

come in more predominantly in summer and early fall. In contrast, western Canada is on an export basis annually for nearly all grains with some exceptions.

In addition to the cost of transport and logistics, however, the spread can also convey important market information regarding market conditions in both the US and Canadian regions. When the spread varies from the cost of transport and logistics, it means that there are supply and demand factors that are at work in either the export or importing regions. Furthermore, in a region like Ontario for corn, local conditions can cause the region to be on an export and import basis at different times of the year.

The differences in local supply and demand are immediately reflected in cash market or spot market prices. For example, if the supply of livestock or grain is seasonally short relative to local regional Canadian demand, the spread can become less than the cost of transport. That is, spot market bids become more than the US price adjusted for transport. Grain produces often experience counterseasonal basis swings when a local user ends up short due to supply or other issues.

The spread or basis can also provide important information about the factors that influence demand in different regions of Canada. For livestock, the demand is generated by either packers or livestock finishers, whereas for grain, the demand is generated by elevators, industrial users or livestock finishers.

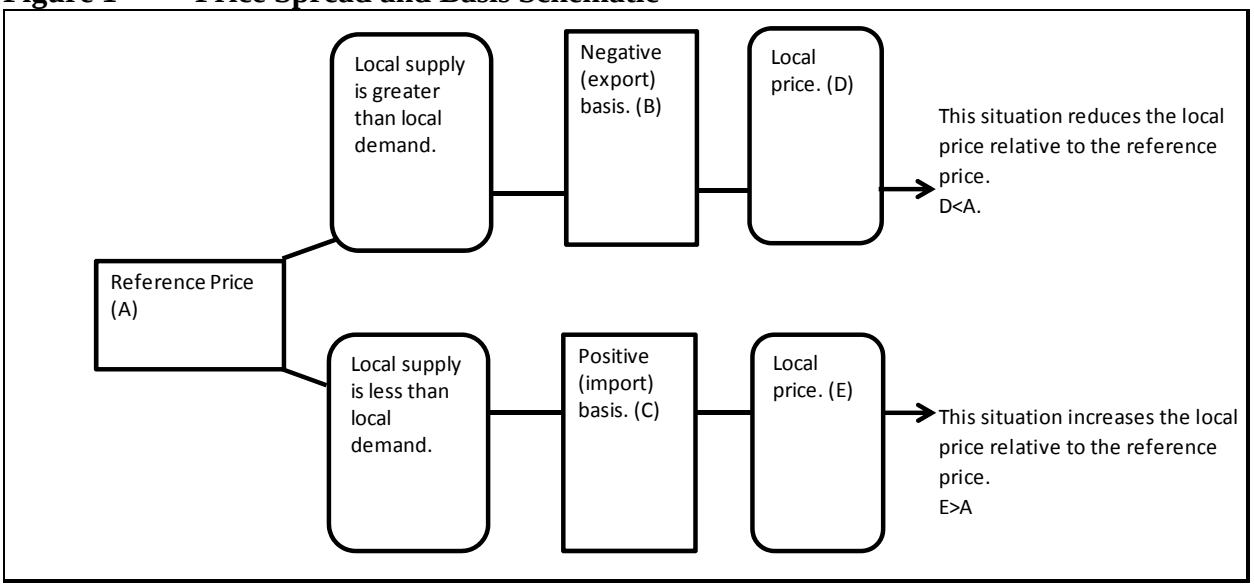
2.1.4 Summary of Price Discovery and Determination

Prices in Canada are derived by both micro and macro factors. That is, prices are influenced by global or North American supply and demand for livestock on one hand and modified by local conditions on the other hand. These big and small picture factors are reflected in either spot market prices or in formula prices in Canada. Local conditions are reflected in the basis or spread. Spot market prices immediately reflect any change in local conditions. Formula or contract prices reflect changes that are likely to be longer term.

The spread or basis conveys important information about local or regional supply and demand in Canada. Even though the US or global market is the greatest determinant of overall price levels, the basis or spread is a crucial factor in the final price. At the same time, the spread or basis is determined by local supply and demand conditions. Hence, the local supply and demand conditions determine whether an industry is on an import or an export basis for an agricultural commodity.

The following graphic helps to summarize the discussion above and to simplify the impact of local Canadian conditions relative to the US reference price.

Figure 1 Price Spread and Basis Schematic



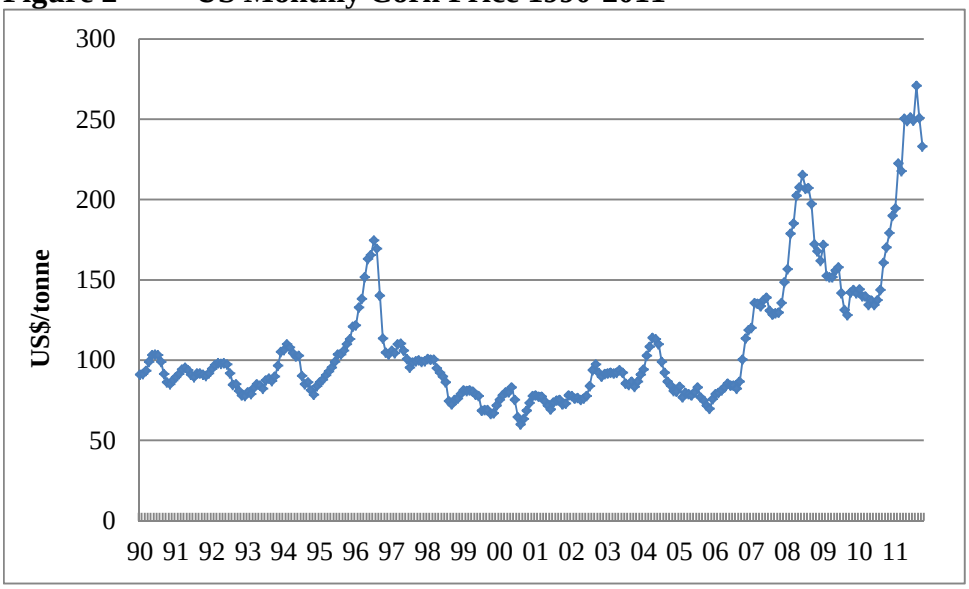
The most important summary point of this discussion is that the local conditions that influence price are more important than US or global prices in determining local grain and livestock prospects and opportunity.

The next section of the report describes developments in US grain corn pricing. As noted above, the US provides the macro or reference price level for Canada. As such, the next section provides perspective and the starting point for grain pricing in Canada.

2.2 US Corn Market Developments

As noted in the section above, first phase of the pricing process for grains is the US price for corn. The US price sets the overall pricing level for corn in Canada. As discussed after that point, the exchange rate and spread/basis come into play. With regard to US prices, the following graph shows US grain corn prices on a monthly basis from 1990 through October 2011.

Figure 2 US Monthly Corn Price 1990-2011



Source: USDA National Agricultural Statistics Service (NASS)

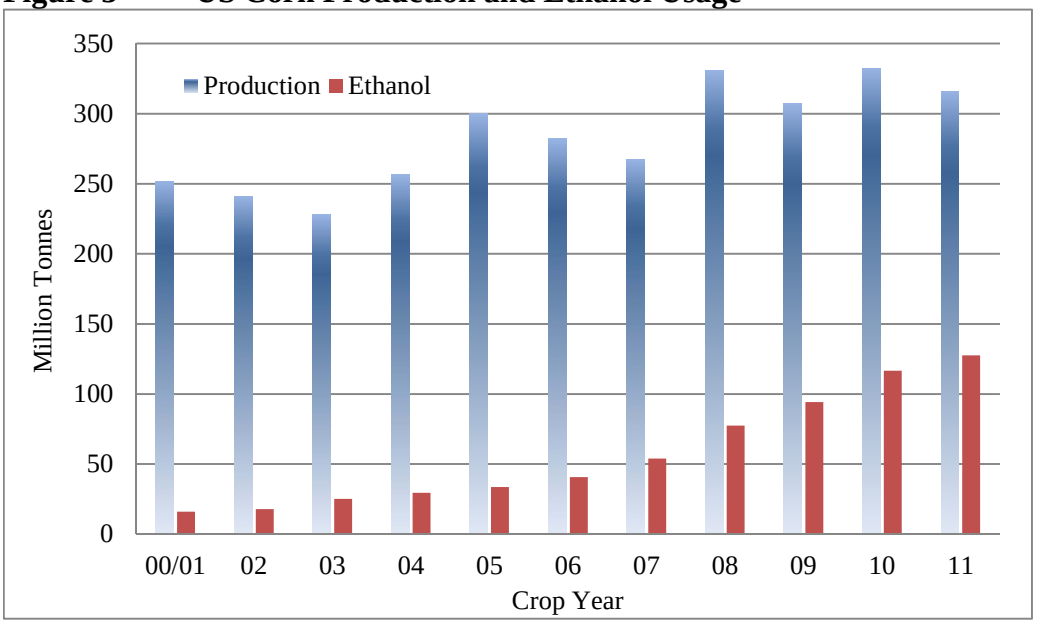
As can be seen on the graph, for nearly two decades from 1990 through 2006, US grain corn prices were approximately US$90-100/tonne or about $2.30/bushel. From 2007 onward, prices have risen dramatically to more than double the pre-2007 norm. The graph shows the sharp decline in pricing in 2009 which illustrates the impact of the 2008-2009 recession and commodity pricing collapse. Even during 2009, however, prices were 1.6 times greater than the pre-2007 average.

The question obviously is what caused the sudden pricing increase?

The ethanol industry in the United States has grown dramatically since the government's "Renewable Fuels Standard" (RFS) was expanded in 2007. That standard mandated that ethanol must be included up to 10% in gasoline, compared to 5% prior to the RFS. That plus extensive operating subsidies for the industry resulted in dramatic increases in ethanol and corn diverted to ethanol production.

The following graph shows US corn production as well as the volume of corn being used by the ethanol industry.

Figure 3 US Corn Production and Ethanol Usage

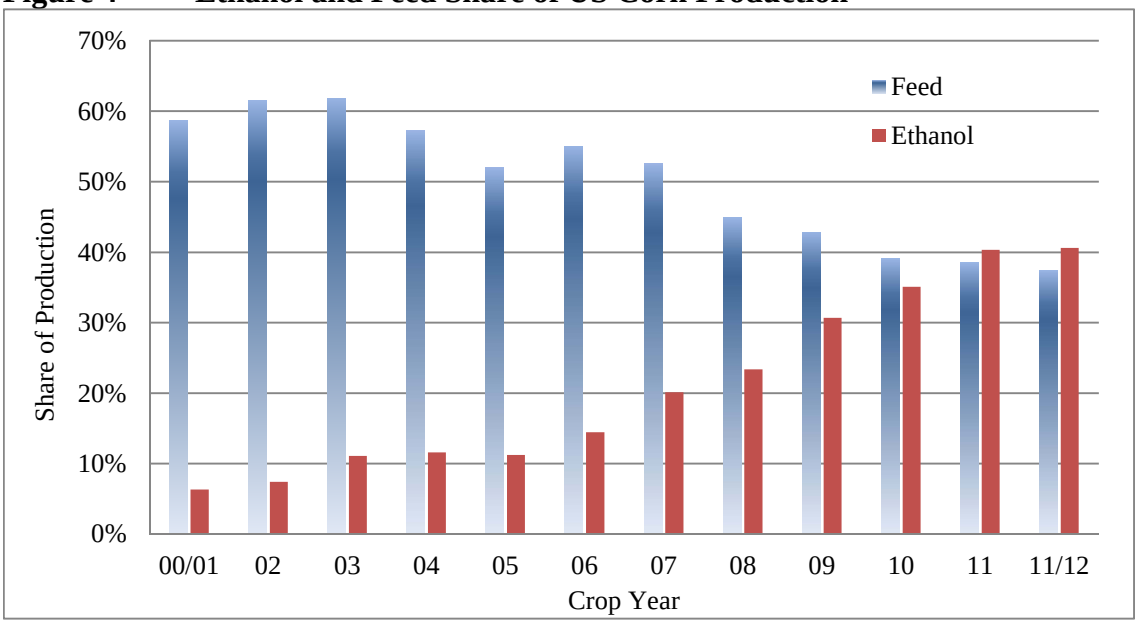


Source: USDA Economic Research Service (ERS)

As can be seen, during the four years from 2008-2011, production has ranged around 310 to 330 million tonnes. During that time, ethanol has used a steadily increasing volume of corn, increasing by more than 2.4 times from 2007 to 2011.

Figure 4 shows the share of total corn production going to ethanol and to livestock feed.

Figure 4 Ethanol and Feed Share of US Corn Production

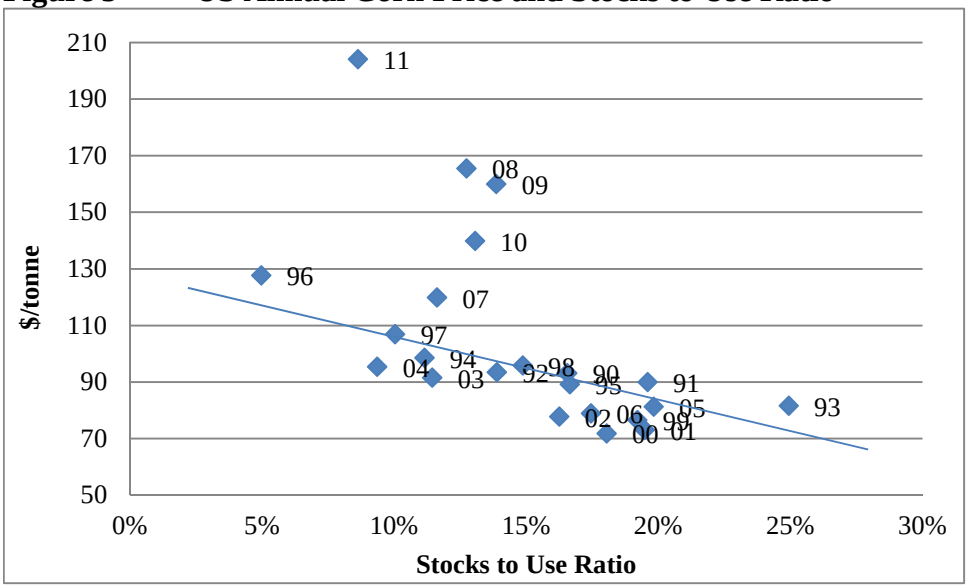


Source: USDA ERS

In the latest crop year 2010/11, ethanol surpassed feeding as a share of corn production. USDA is projecting that share will increase again in 2012.

The government mandated use and subsidization of ethanol created a new and dominant demand for corn. In a short period of time, there was a major increase in a once relatively small classification of corn usage in the United States. Further to that usage, reference, the stocks to use ratio is a closely watched measure of how tight corn supplies are relative to their usage. The stocks to use ratio is the most important indicator of supply and demand. When the ratio is combined with price, it provides an indication of the overall market conditions for corn. The following graph shows corn prices relative to the corn stocks to usage ratio.

Figure 5 US Annual Corn Price and Stocks to Use Ratio



Source: USDA ERS

Figure 5 clearly shows the results and impact of the imposition of the RFS in the US in 2007. The new source of demand created by ethanol in 2007 resulted in new pricing levels each year from 2007 to 2011.

Research conducted by Dr. Tom Elam, President, FarmEcon and Dr. Steve Meyer, Paragon Economics, in December 2010 sought to examine that pricing impacts of ethanol. The paper was entitled, "Feed Grains, Ethanol and Energy – Emerging Price Relationships." Their research determined that absent the ethanol production and price effects, the 2010 crop average corn price would be forecast at $3.00 per bushel, $2.20 less than the current forecast.

It is noted that the U.S. federal subsidy for corn ethanol, which amounted to roughly $6 billion per year, ended on January 1, 2012 causing companies making ethanol to lose a tax credit of 46 cents per gallon. In addition the steep import tariffs on the industry's foreign competitors also ended at the same time. As noted above, the major boost to ethanol usage and corn prices is the RFS which mandates ethanol's use. That RFS is still in effect and as such, the impact on of the subsidy removal is not expected to materially impact corn prices.

The main point is to note that the US corn market has been driven higher by ethanol mandates. This then becomes a key price determinant for grain prices in Canada, both east and west.

The next section of this report develops the economic logic illustrating the conceptual importance of local conditions. The section uses Ontario corn as an example, but it could be any region of Canada or any crop. The example also uses ethanol as the change driver in terms of local supply and demand.

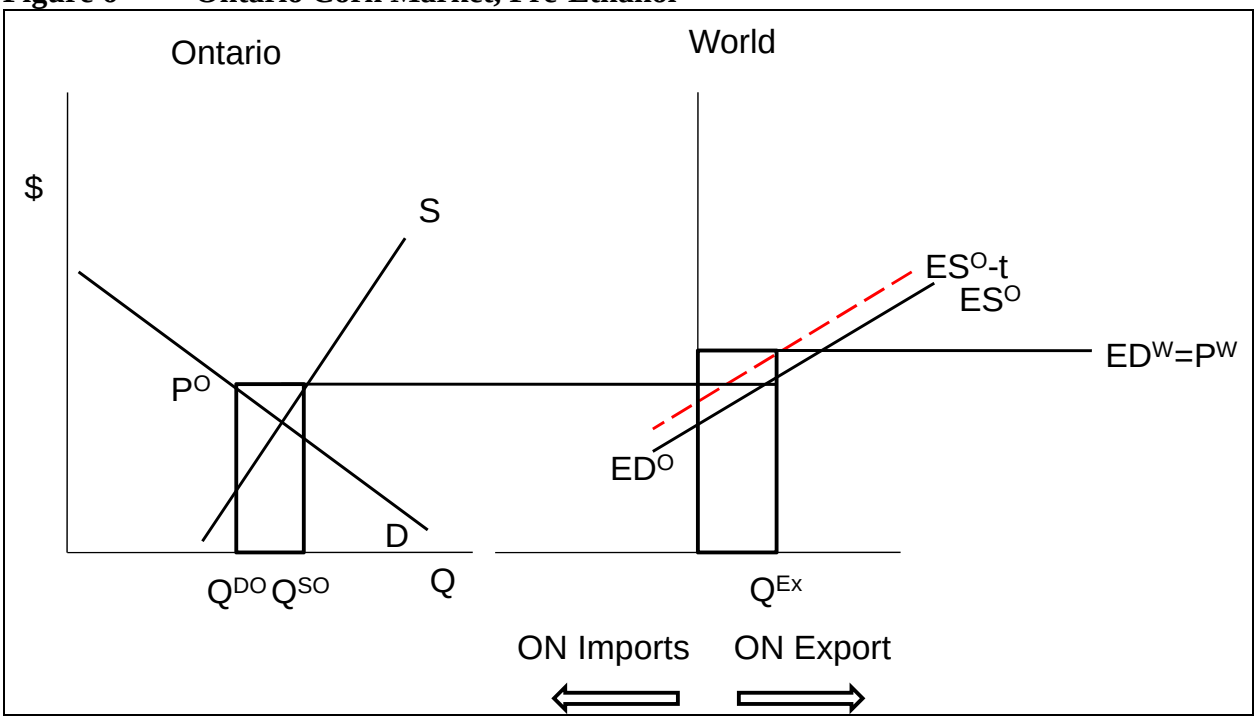
2.3 Ontario Corn Market Local Supply and Demand Drivers

The section above described the macro environment driving Canadian grain prices. A main purpose of this paper, however, is the examination of local Canadian factors and their importance to the local situation and prospect. As such, the rest of this paper focusses on Canadian factors, within the context of the overall determination framework in the US.

Historically, throughout most of the year, Ontario has been a latent or dormant corn exporter. In practice, the trade in corn occurs in both directions with the US throughout the year and the structural price incentives for corn imports typically occur between early summer and the onset of the new crop harvest in the fall. The bulk of imports come in during this period. For practical purposes, Ontario is a small producer of corn and does not affect the world (or US) price. Rather, the supply and demand conditions in Ontario influence the Ontario price and the directional flow of trade.

Figure 6 below attempts to summarize these factors. The figure has two panels- on the left is a representation of the Ontario market and on the right is a representation of the world and US market.

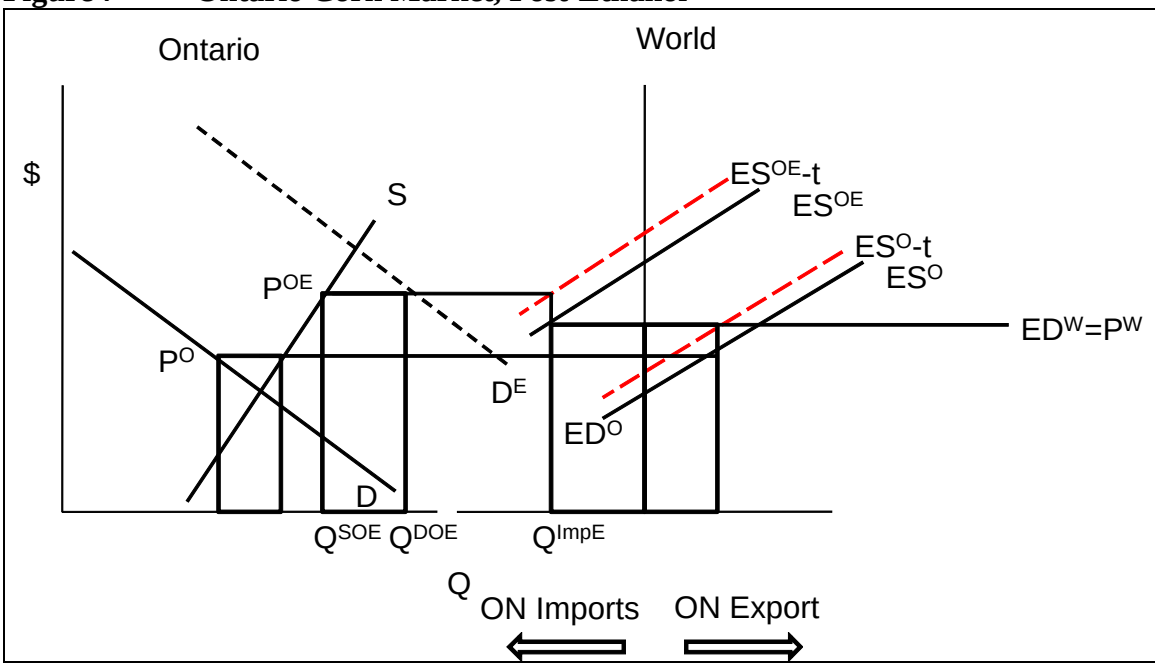
Figure 6 Ontario Corn Market, Pre-Ethanol



The figure shows Ontario as a corn exporter. The Ontario price is determined by the interaction between Ontario's excess supply (ES^O) and the world excess demand (ED^W); the world demand faced by Ontario is price insensitive to the volume supplied by Ontario. The effective Ontario price reflects the transportation cost (t) of corn movement. This dynamic generates an Ontario corn price of P^O, quantity supplied Q^{SO} and quantity demanded Q^{DO}. Since Q^{SO} exceeds Q^{DO} exports Q^{Ex} occur; note that the Ontario price is below the world price P^W- this is known as an export pricing basis. Also note that by exporting corn, the Ontario price is higher than it would have been based on the intersection of Ontario supply and demand conditions alone.

Figure 7 presents the changes to the above due to the development of ethanol production in Ontario. Ethanol mandates and subsidies have the effect of shifting Ontario corn demand from D out to D^E. This in turn structurally changes the Ontario corn market. The Ontario excess supply curve shifts from ES^O to ES^{OE} which generates a price in the Ontario market of P^{OE}. At this price level, the quantity demanded in the Ontario market is Q^{DOE} which exceeds the quantity supplied Q^{SOE}, leaving Ontario in a corn deficit position which is filled by corn imports from elsewhere Q^{ImpE}. After accounting for transportation cost t, P^{OE} is higher than the world price. Thus, ethanol development has the anticipated effect of shifting Ontario pricing from an export price basis to an import price basis.

Figure 7 Ontario Corn Market, Post-Ethanol



2.3.1 Summary and Discussion

Before any ethanol development in Ontario occurred, a seasonal shift in the pricing basis occurred that was similar to the change illustrated in Figure 1. That is, seasonally, supplies were short in the summer, leading to an import basis. Moreover, Ontario has been a net importer of corn for some time- the short period in which the import basis prevail accounts for the bulk of imports. The period in which the export basis prevails also has not resulted in mass exports of

corn- Ontario corn exports are relatively small; rather the export basis period is one in which imports from the US are even smaller. The critical point is that ethanol development tilts the balance strongly toward corn imports and an import basis, and away from the export basis.

The conceptual model suggests that the effect of corn supply response on ethanol development in Ontario is likely to be sharply limited. Because there is free trade with the US in corn, the effective range of corn price effect attributable to Ontario ethanol development is the basis, which is typically a small proportion of the overall corn price (usually tied to the cost of transportation). In other words, there is not an economic rationale to expect a substantial increase in Ontario corn production due to Ontario ethanol development.

Finally, the above does not account for, nor anticipate fluctuations in the currency exchange rate. As grain traders know, exclusive of any other factors, a weak or weakening Canadian dollar increases the Canadian price relative to the US price. Conversely, a strong or strengthening Canadian dollar decreases the Canadian price, all other things being equal.

The purpose of this section was to provide the theory and an example behind the argument that local supply-demand conditions are crucial to pricing. The example was Ontario corn with ethanol as the change driver. The example could also have been Prairie grains with ethanol as the change driver. This is very important because it is generally claimed that since Canada is a price taker in grain, that local changes in supply and demand do not matter. This section demonstrated that local conditions matter to grain prices in Canada.

Given that local conditions are crucial to grain pricing, it follows that those local conditions impact those industries that depend on grain as inputs. The next section of this paper provides a theoretical framework to demonstrate how the changes in the grain basis impact livestock and meat, using Ontario corn as an example. The assertion for the remainder of this paper is that ethanol impacts the Canadian grain basis which in turn impacts the prospects and fortunes of the Canadian livestock industry.

2.4 Conceptual Framework for Grain Basis Impact on Livestock and Meat

2.4.1 Feeder Livestock Markets

A distinct observation on North America livestock segments is that livestock generally move toward regions of surplus grain, rather than vice versa. It is inherently less expensive to transport feeder animals to feed than it is to transport feed to feeder animals, given rates of feed conversion in cattle and hog feeding and grain transport costs. Hence, regions compete for feeder animals based on the strength of relative grain pricing, where the driver of competition for feeder animals is the grain basis.

The following example illustrates the concept. Consider a 900 pound (lb.) animal that will be fed to a weight of 1400 lbs. Suppose that the price of the fed animal s $1/lb. and that the cost of feed is $0.80/lb. of gain. Then the revenue base from the fed animal is $1400/head, and the cost of feed is $400/head, leaving a maximum bid price for the feeder animal of $1000/head. Now, suppose that the local grain basis strengthens such that the cost of feed increases to $.90/lb gain.

Then the cost of feed increases to $450/head, and the maximum that could be bid for the feeder animal is $950/head. If the feed basis has not strengthened concomitantly in competing regions, the local region becomes uncompetitive for feeder livestock.

Thus, the strengthening of grain basis shifts back the demand for feeder animals. The effect of this is illustrated in Figures 3 and 4. In this case, the figure has three panels- Ontario market, the US market, and the North American market. Unlike the figures above for corn, Ontario is sufficiently large to influence the trade market in feeder livestock. In Figure 3, Ontario initially has a supply of feeder livestock of Q^{SON}. On the strength of relatively low corn prices, it has a demand given by Q^{DON}, with the difference in difference in Ontario supply and demand given by its excess supply, ES^{O}, at transport cost, t. Given US excess demand for feeder livestock ED^{US}, North American pricing on feeder livestock settles at price P^{O} and Ontario exports feeders given by Q^{EX}, which corresponds to US demand Q^{DUS} less US supply Q^{SUS}.

Figure 8 illustrates the situation under a strengthening corn basis associated with ethanol production. With the strengthening corn basis, the Ontario demand for feeder livestock shifts back to D^{E}, which means that more feeder animals are available for export. As a result, the price of feeder animals falls to P^{OE}, Ontario livestock feeding falls to Q^{DONE} and the supply decreases to Q^{SONE}, with the net effect increased feeder exports of Q^{Ex} and increased US imports given by Q^{DUSE}- Q^{SUSE}. Thus, the strengthening corn basis due to ethanol dampens the Ontario demand for feeder animals, dampens the North American feeder cattle price, and results in less livestock feeding in Ontario and more livestock feeding occurring in the US.

Figure 8 Regional Competition for Feeder Livestock

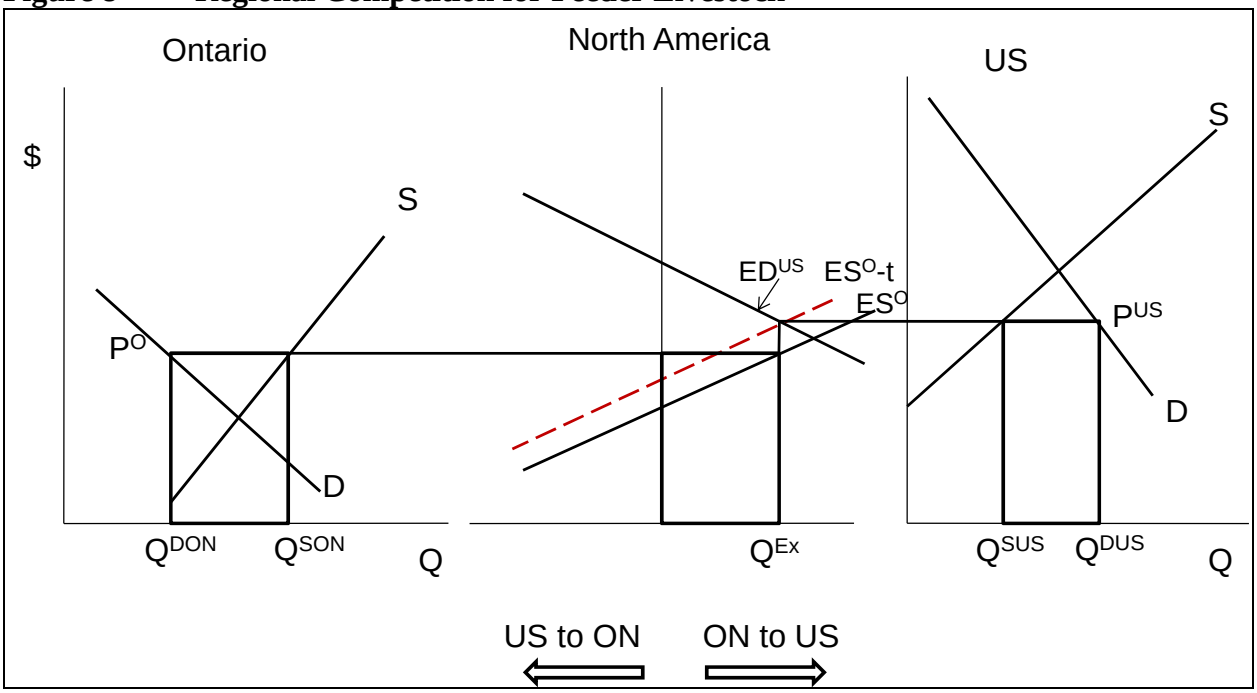
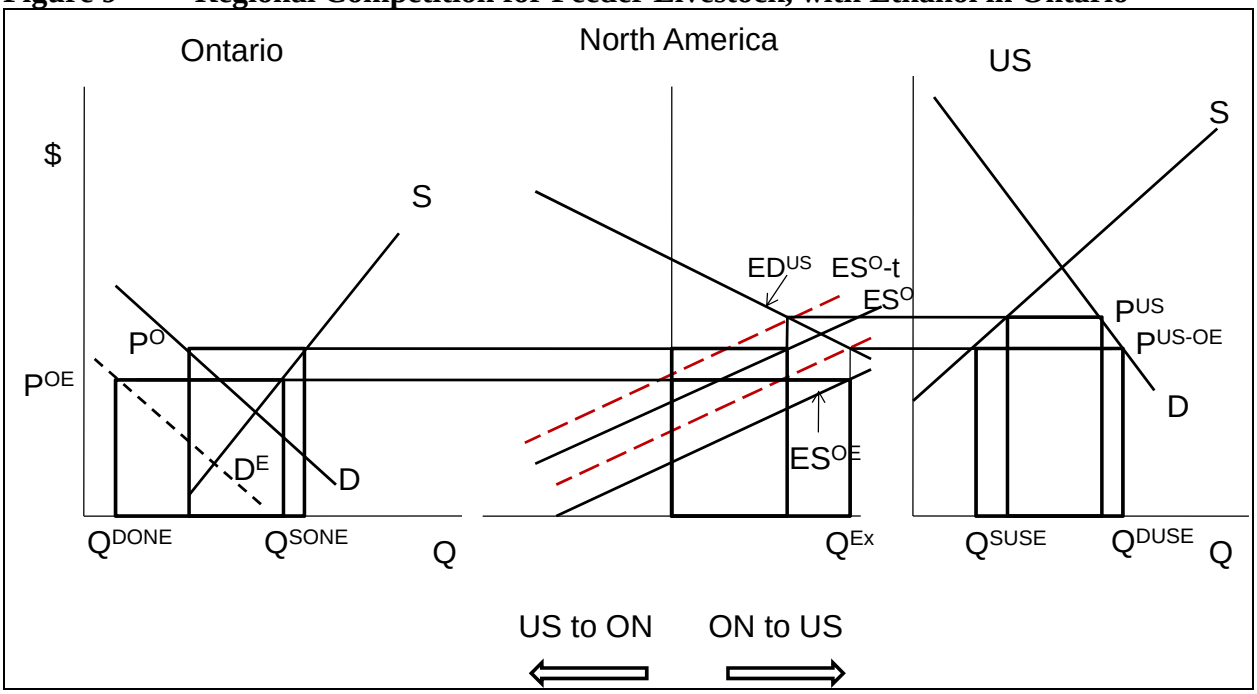


Figure 9 Regional Competition for Feeder Livestock, with Ethanol in Ontario



2.4.2 Meat Markets

Extending the livestock model above further, it is inherently less expensive to transport meat in chilled or frozen form than it is market weight animals; thus primary livestock processing tends to locate itself where market weight animals are produced, rather than in urban areas where consumer markets are located. Indeed, investments in primary slaughter plants in pork in Manitoba and beef in Alberta from 1989-2011have followed this logic.

The conceptual understanding of meat trade development is really an extension of livestock production. As such, this section will avoid the theoretical illustrations used for livestock above. The point is that the decrease in fed animal production decreases the slaughter and supply of meat, just the way a decrease in the local demand for feeder animals leads to a decrease in fed animal production.

With reduced fed livestock production, meat production decreases. The Canadian meat processors export extensively, and without cost competitiveness relating ultimately to feed, this could not occur. There is also a next step that is very important. Higher feed costs lead to less meat. Less meat is a result of reduced livestock slaughter. Reduced slaughter means excess packing (and feeding) capacity. Ultimately due to high fixed costs this means a reduction in capacity longer term, which given a high level of concentration and contribution to the economy, is a significant transition.

2.4.3 Observations

The above captures the mechanism through which ethanol mandates and subsidies impact livestock and meat markets. The principal observation is not that developing ethanol industry in

Canada through mandates and subsidies broadly increases grain prices. The principle observation is that it increases *relative* grain prices in the local Canadian markets. The strengthening in the corn basis, rather than the world price of corn, anticipates far-reaching effects in terms of adjustments in the location of livestock feeding and meat production as well as the associated economic development.

The next sections look at the data to demonstrate how these arguments have evolved in the Canadian livestock and grain industry.

3.0 Canadian Grain Price Drivers

This section of the report looks at Canadian grain prices relative to the US. It also examines the local conditions that drive Canadian prices and their impacts.

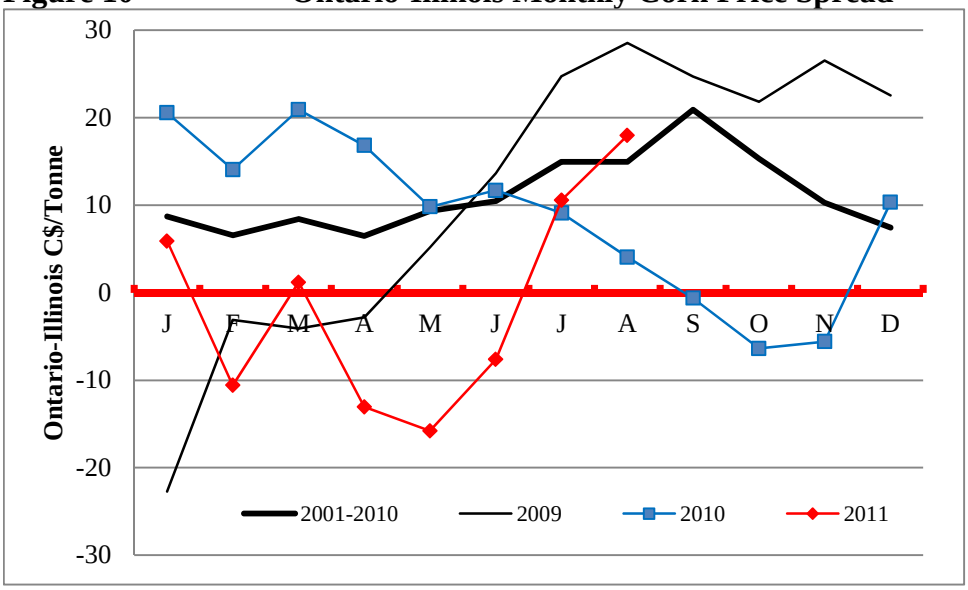
3.1 Ontario and Alberta versus the US

The purpose of this section is to demonstrate price spread patterns and magnitudes between Canada and the US. This section examines the relative pricing patterns between Canada and the US. Ontario and Alberta are chosen as examples but any other regions of Canada could have been used.

3.1.1 Ontario Corn Price Spreads

The following graph shows the corn price spread between Ontario and Illinois on a monthly basis for 2009, 2010 and 2011 (through August) as well as the previous ten year average. The spread is illustrated in Canadian dollars on a per tonne basis. Illinois is chosen as it is a large corn production region in relative close proximity to Ontario. The source is Statistics Canada and USDA National Agricultural Statistics Service, which both describe the prices as those "received by farmers."

Figure 10 Ontario-Illinois Monthly Corn Price Spread



Source: Statistics Canada (Cansim) and USDA National Agricultural Service (NASS)

Over the past ten years, the spread between the two regions has averaged about +$10/tonne (Table 1) with the widest in late summer/early fall. During this time of year, the spread is often wide enough to draw in imports of corn from the US into Ontario. At other times of year, the spread is narrow enough to allow for exports of Ontario corn.

Table 1 Ontario-Illinois Price Spread 2001-2010 Monthly C$

Average	11
Minimum	-23
Maximum	35
Standard Deviation	11

Source: Statistics Canada and NASS

Over most of the last 15 years, Ontario has been a net importer of corn, which would suggest a positive price basis relative to US corn. However, that is not always the case. Two factors appear to be the main drivers of the price basis or spread of corn in Ontario:

- the size of the corn crop in any given year, and
- the seasonal pattern of corn supply vs a fairly constant demand for feed and industrial use throughout the year

In years when Ontario produces a large corn crop, the price basis can be negative after the crop has been harvested and become positive once the local supply has been reduced. This pattern is influenced by elevators wanting to free up space in early summer for Ontario wheat. It is during this period that imports are more likely to occur. In years when Ontario produces a smaller corn crop, the post-harvest basis may be less negative or slightly positive and become positive earlier in the season if local supply is not adequate to meet demand.

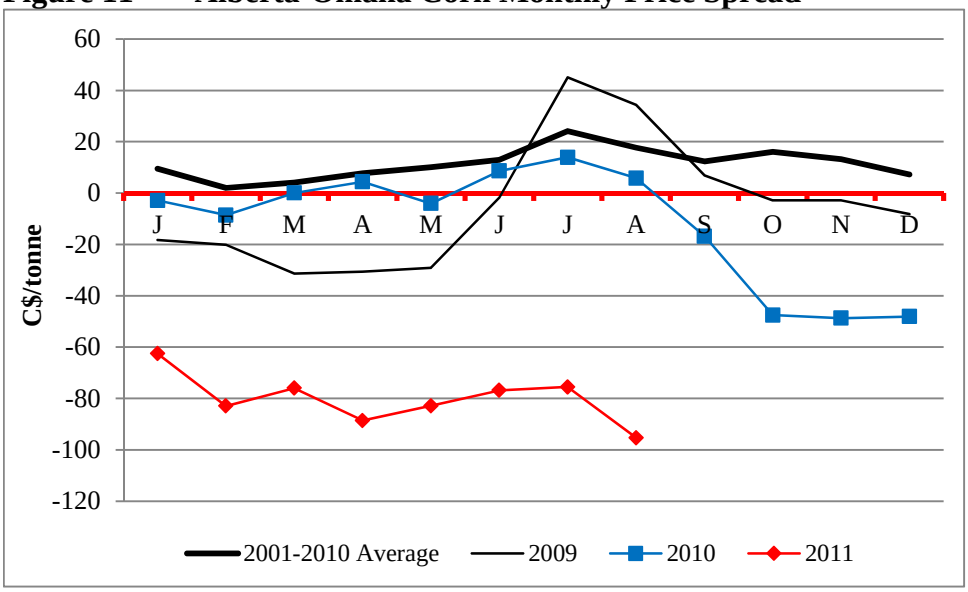
The other point of note from the graph is the wide variation in patterns in the years shown. Clearly the behavior of the spread in 2010 and 2011 is counter to the average performance. This is particularly the case given the extended period of time when the spread was negative. That of course suggests local supply during these two years has been greater than its normal relationship to demand.

Finally it is also worth mentioning that according to industry transporters, corn back into Chatham/Kent area of Ontario out of Michigan costs between $22/tonne to $30/tonne. Cost out of Ohio or Illinois to Ontario would be at a higher rate. That suggests that the ten year $10+- price spread is not likely enough on average, to move grain in significant volumes relative to local use.

3.1.2 Alberta Price Spreads

The next graph shows the price differential between Alberta barley and Omaha corn, on a barley equivalent basis in Canadian dollars per tonne. The graph shows the previous ten year average as well as 2009, 2010 and 2011 through August. Omaha, Nebraska was chosen due to its role as a widely quoted corn price benchmark, as well as its geographic proximity to Prairies. The Alberta price utilized was for the Lethbridge area, a region of high feedlot concentration and usage.

Figure 11 Alberta-Omaha Corn Monthly Price Spread



Source: Canfax

As with the Ontario spread, the Alberta-Omaha spread has averaged about $10/tonne over the past ten years. The other point of interest which is similar to the Ontario performance is the more extended period of time that the spread has been negative in the last two years.

3.1.3 Summary Points

The main points of the illustration of the price spreads are the following:

- There are rough seasonal pricing relationships between Ontario and the US as well as between the Prairies and the US.
- There is wide variability of trends and performance from year to year within the confines of the seasonal relationships.
- On average over the past ten years Canadian price levels have tended to be higher than corresponding or counterpart regions in the US.
- During the past two years, Canadian price levels have tended to be lower than the corresponding price levels in the US.

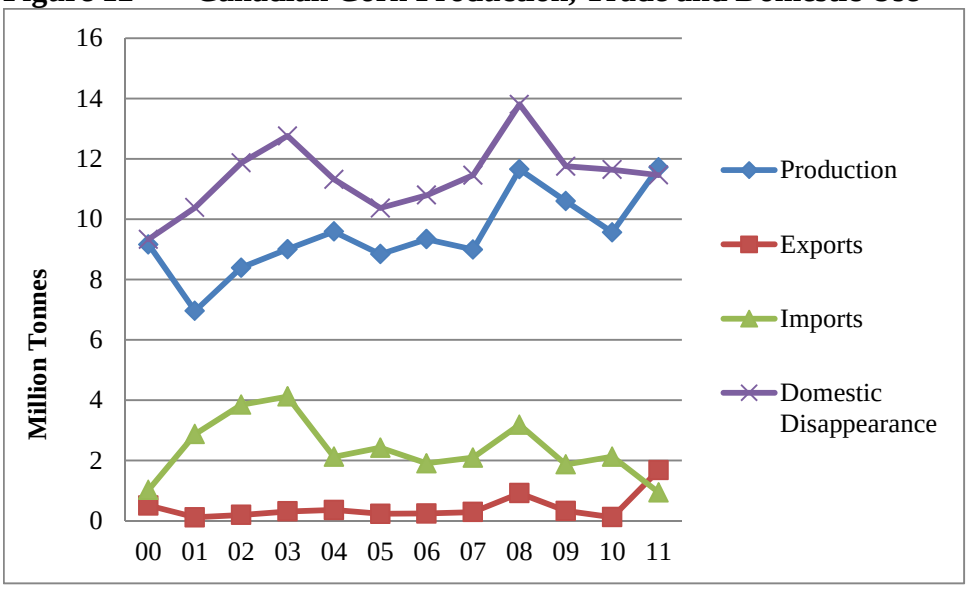
3.2 Factors Impacting Local Prices and Spreads

The purpose of this section of the report is to examine the factors that impact the spread and the order of magnitude of those factors.

3.2.1 Supply and Demand for Grain Corn in Canada

Figure 12 shows Canadian corn production, trade and domestic disappearance. Ontario comprises about two thirds of Canadian corn production.

Figure 12 Canadian Corn Production, Trade and Domestic Use

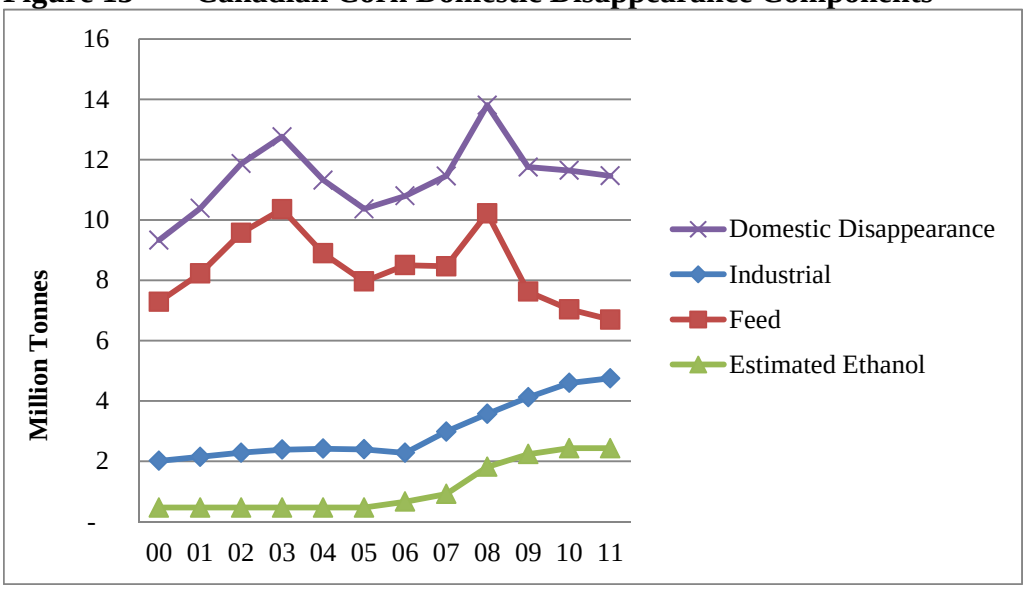


Source: Statistics Canada Cansim Supply and Disposition Tables

Canadian corn domestic usage has generally exceeded production by about 1.9 million tonnes on average. Not surprisingly, that is roughly equal to Canadian net imports over that same time frame.

The next graph shows the breakdown in domestic disappearance into Food and Industrial Use and Animal Feed, Waste and Dockage, as classified by Statistics Canada. For practical purposes it is simply broken down into Industrial Use and Feed. Industrial Use in turn can be broken down to ethanol and human uses such as oil, sweeteners and starch. The graph breaks out estimated corn for ethanol use as a sub-component of Industrial. The ethanol estimated usage is based on industry production capacities as published by the Canadian Renewable Fuels Association (CRFA).

Figure 13 Canadian Corn Domestic Disappearance Components

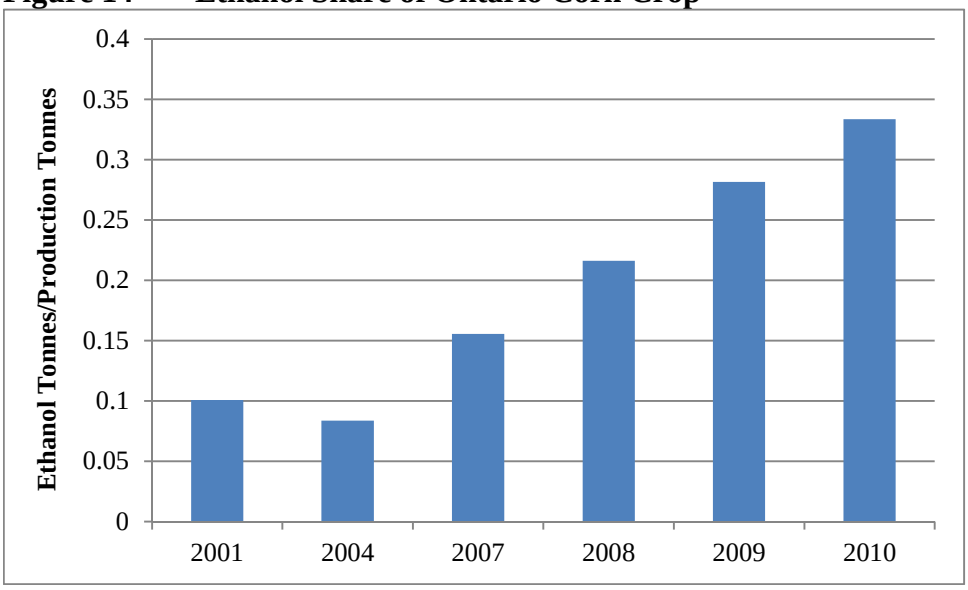


Source: Statistics Canada Supply and Disposition Tables

During the 2008-2011 period ethanol consumed approximately 25% of the Canadian corn crop or about a third of the Ontario crop. The CRFA association stated in their 2010 publication "Growing Beyond Oil" that "Ethanol production is now utilizing about 27% of the Canadian corn crop." It also stated in that report that the ethanol industry consumes close to one third of the corn produced in Ontario. In raw tonnage terms, ethanol uses about 2.1 million tonnes of grain corn in Ontario and another 300,000 in Quebec. Other reported estimates have been over 2.5 million tonnes. Tonnage estimates can vary, but the point is that the volume is significant and that it has grown rapidly.

The growth in share of the ethanol tonnage from 2001 to 2010 is presented in Figure 14. That stands in contrast to the loss in share of the feed usage in Ontario. Ethanol usage of corn in Ontario has grown by a factor of nearly five times over the decade. Over that period of time, the feed share has declined to about 60% of the Ontario crop.

Figure 14 Ethanol Share of Ontario Corn Crop



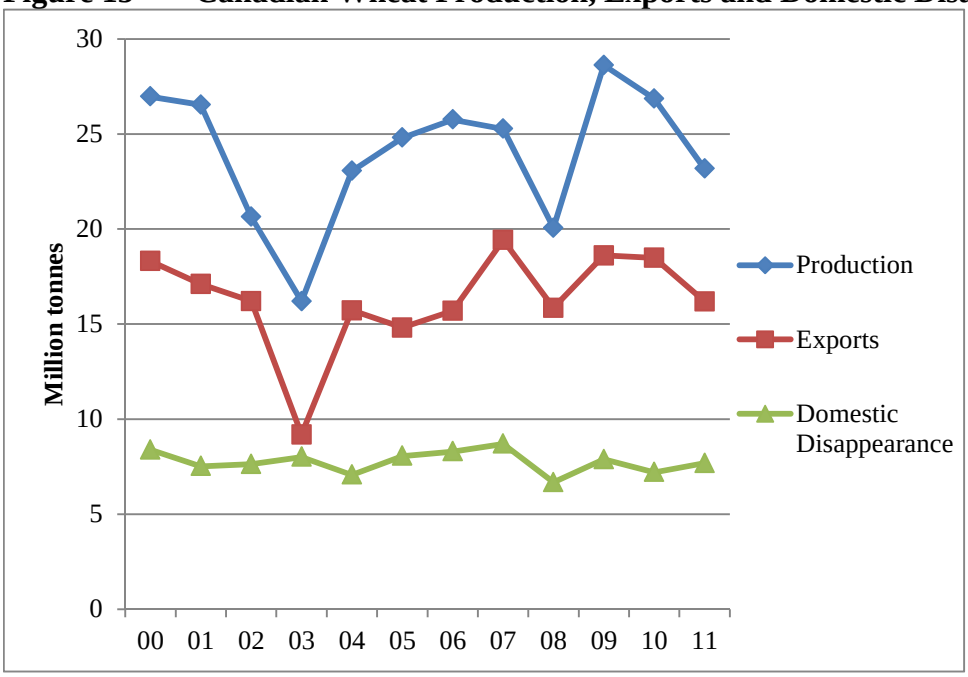
Source: 1 Statistics Canada Cansim and CRFA

3.2.2 Supply and Demand for Wheat in Canada

In western Canada, the main feedstock for ethanol is wheat. As such, this section of the report provides an overview of the supply and demand factors for wheat. It also looks at the impact of those supply and demand factors' impact on price, as they relate to ethanol.

The following graph shows the production, domestic disappearance and exports of wheat in Canada. Over 90% of the wheat in Canada is produced in western Canada. There are three main characteristics that are apparent from the graph: the stability of domestic disappearance, close relationship between production and exports, and the massive size of exports. Exports are about two times larger than domestic disappearance. Of the uses for wheat, exports are by far the most significant.

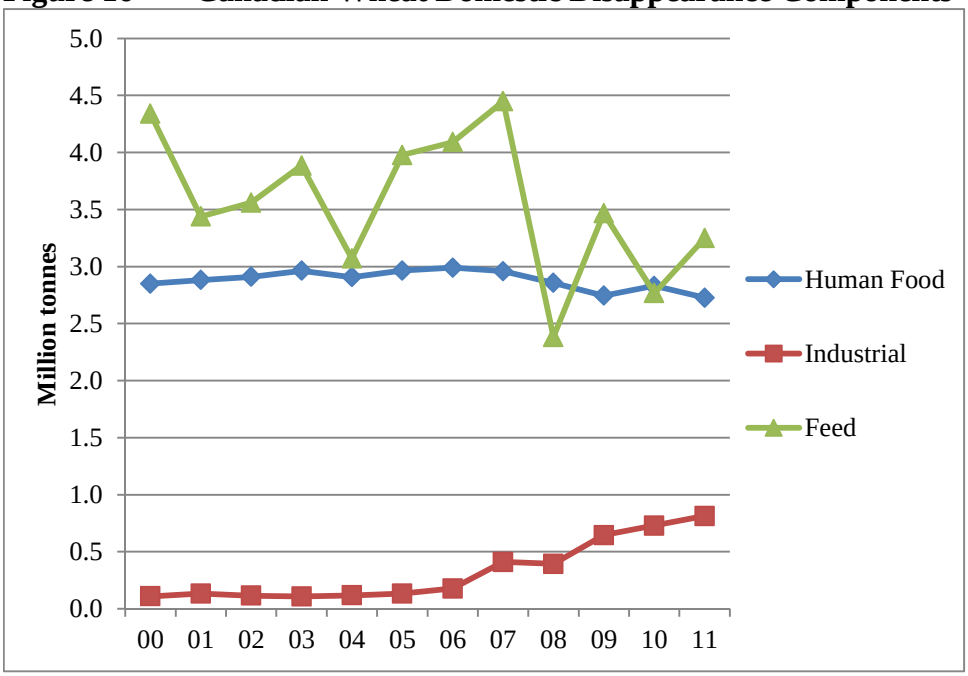
Figure 15 Canadian Wheat Production, Exports and Domestic Disappearance



Source: Statistics Canada Cansim Tables

Domestic Disappearance is comprised of human food, animal feed and industrial usage. Figure 16 shows the breakdown of domestic disappearance over the past decade.

Figure 16 Canadian Wheat Domestic Disappearance Components



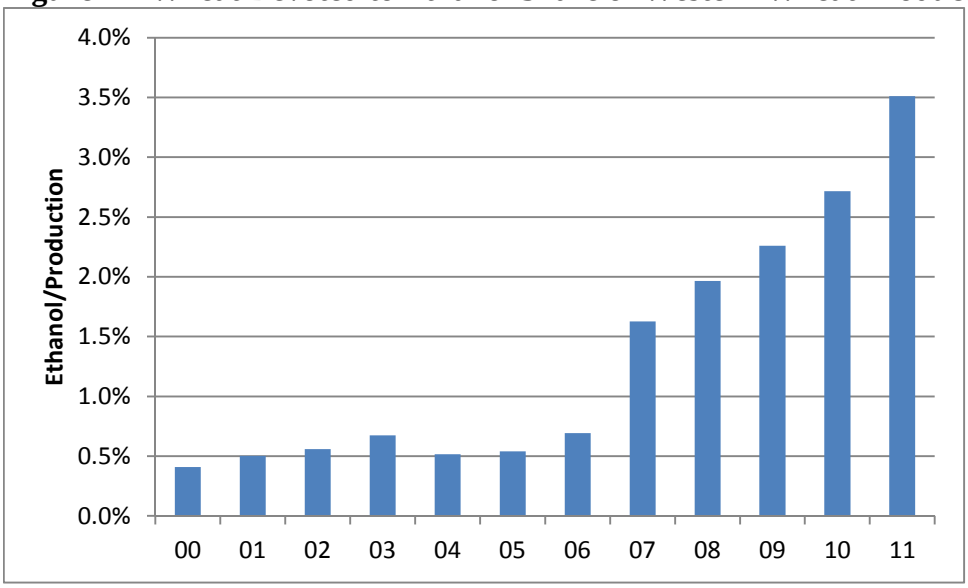
Source: Statistics Canada Cansim Tables

There are three main points that can be discerned from the graph. The first is the erratic but obvious decline in feed use. The second is the relative stability in use for human food. The third

point is the significant increase in industrial use. This is particularly important as the overwhelming majority of industrial use is ethanol. Ethanol likely comprises about 95% of total industrial usage. Ethanol usage of wheat on the Prairies has rapidly moved from being very insignificant to being an important component of domestic disappearance.

Another perspective on ethanol is its share of the wheat crop. The following graph shows the share of the wheat crop dedicated to ethanol in the West.

Figure 17 Wheat Devoted to Ethanol Share of Western Wheat Production



Source: Statistics Canada Cansim Tables

The share of the crop dedicated to ethanol for wheat is relatively small compared to the share of the corn crop in Ontario. With that noted, the share has grown rapidly during the last five years. The share move to nearly 4% makes it a notable component of the market during the last five years. For more perspective, the share of domestic disappearance of wheat going to ethanol in the last two years has amounted to over 10%. That is compared to just 2% in 2006. The point is that ethanol is becoming an important factor in the western grain market.

It is also important to note that the livestock industry in the west tends to use the lower grade wheat and barley ("feed grade") which are not suitable for human consumption either as flour or malt for beer. The ethanol also uses feed grade production. Hence the amount of these grades available for feed is being affected much more than the data and graphs show.

For further perspective, the pending ethanol facility to be located in Innisfail, Alberta received $15 million from the Alberta government. It will use approximately 300,000 tonnes of wheat per year. That volume would supply about 80% of the pig feed wheat needs in Alberta, given that the province's hog producers feed about 25% feed wheat in the ration on average.

3.3 Supply and Demand Impacts on Price

As argued above in section 2, local supply and demand changes do have an impact on the local or regional price. That is, while Canadian grain prices are largely determined by US or global grain prices, local supply and demand conditions impact local prices. That impact is reflected in the basis or price spread relative to regions in the US.

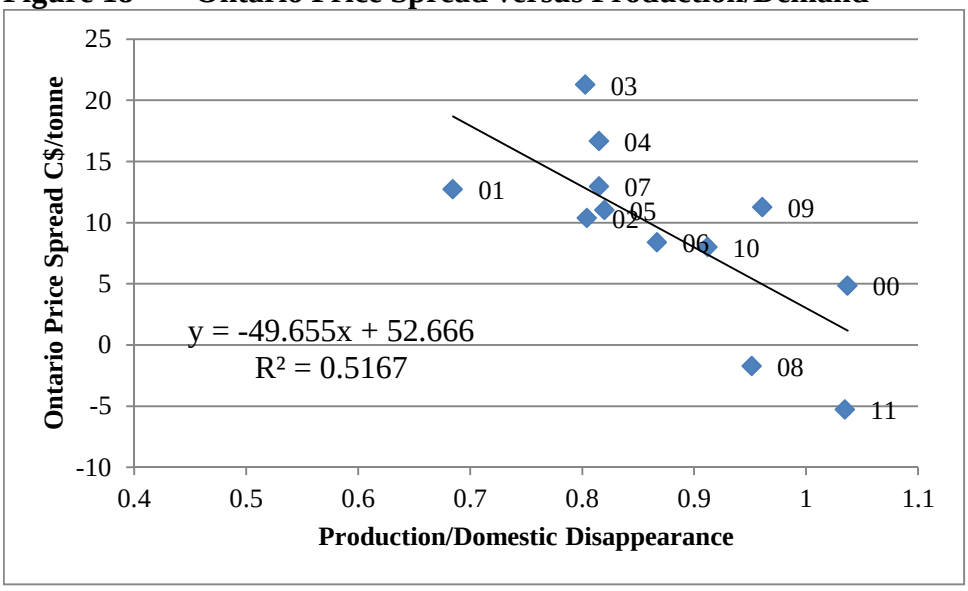
Following this line of thought, it is clear that the dramatic growth in ethanol grain usage is going to impact local grain prices in the east and the west of Canada. This impact on local prices is going to occur independently of global and US supply, demand and pricing. For example, the Canadian Renewable Fuels Association Growing Beyond Oil report states that "clearly, feedstock demand from an ethanol facility increases local prices for corn or wheat." This local Canadian impact is on top of the US impact as discussed in section 2.2 above.

This section of the report seeks to determine the impact that ethanol production has had on Canadian grain price spreads.

3.3.1 Ontario Corn

Figure 18 shows the corn price spread relationship between Ontario and Illinois versus the ratio of Ontario production to domestic disappearance. The graph shows how the price spread reacts to relative changes in demand and supply on an annual basis over the past twelve years, including the first half of 2011. The data points on the graph are the years in which the price to supply-demand relationships took place.

Figure 18 Ontario Price Spread versus Production/Demand



Source: Statistics Canada, NASS

As expected, the lower the production relative to domestic demand the higher the price spread. That is, higher domestic demand relative to production is associated with the higher Ontario prices, as compared to competing jurisdictions. Conversely the greater the production relative to

domestic demand is associated with the lower price spread. Said differently, local supply and demand is having the predictable impact on price spreads.

Ethanol production is a large and growing part of domestic disappearance for the corn crop. The data can be used to generate an indication of how much ethanol production has affected grain corn prices in Ontario. The linear equation on the graph above can be used to determine the impact of ethanol production on the price spread. As stated in section 3.2, the ethanol industry uses over 2 million tonnes of grain corn in Ontario. That volume has a major impact on domestic disappearance as shown in section 3.2.1. That volume moves the recent years' production/disappearance (P/D) ratio from about 1.25 without ethanol to about 0.9 with ethanol. In 2010 for example the ratio was 0.91. Applying the changes in the P/D ratio from 1.25 to 0.91 to the linear equation causes the price spread to swing from about -$10/tonne to +7/tonne. In other words, the 2 million tonnes impacts the local supply-demand balance enough to swing the price spread from negative to positive. That volume can translate into a price spread impact of about $17/tonne or over $0.40 cents per bushel.

Of course there are other statistical methods that can be used to determine the impact of increasing or decreasing the P/D ratio. For example price elasticity and price flexibility measures can be used. The price flexibility measures the response of price to a change in production. In this case the flexibility measure can be applied to the Ontario-Illinois price spread in response to changes in the P/D ratio. Over that last ten years the price flexibility of the spread against the P/D ratio has amounted to -6 to -7. That is the ratio of the percentage change in P/D to the percentage change in the spread is in the -6 to -7 range. Again, with the change in the ratio from 1.25 without ethanol to about .90 with ethanol, that amounts to over 35%. Applying that percent to the flexibility moves the spread from -$12/tonne with no ethanol to nearly +$8/tonne with ethanol. As such, same price spread and production-demand ratios leads to the conclusion that ethanol can impact the price spread in Ontario by about $20/tonne or over $0.50 per bushel.

The price spread impact of about $15-20/tonne is derived based on statistical estimates of past price-supply/demand performance. The price spread impact is well within the wide range of the spread's observed behavior over the past decade. That is, while the spread has averaged about $10/tonne, the range was a between +$35 and -$23. In addition the standard deviation was $11/tonne around the average. As such an ethanol price impact of at least $15/tonne is entirely plausible, given that the product consumes about a third of the Ontario crop. Thus, the ethanol impact is significant given the observed statistical behavior of the spread.

In addition, this estimated impact is consistent with 2011 research conducted for the Grain Farmers of Ontario which stated that "110 million bushels/year of corn are used to make ethanol in Ontario; without this, Ontario corn prices might have been as much as $0.50/bushel less in recent years." The GFC estimate of $0.50/bushel is approximately $20/tonne.

With that noted, the $15-20/tonne estimate is best viewed as an indication of the order of magnitude of the ethanol impact. It is not possible to state a definitive number given the plethora of market factors that come into play. Nevertheless, as stated above the result is plausible and relevant in terms of illustrating impact.

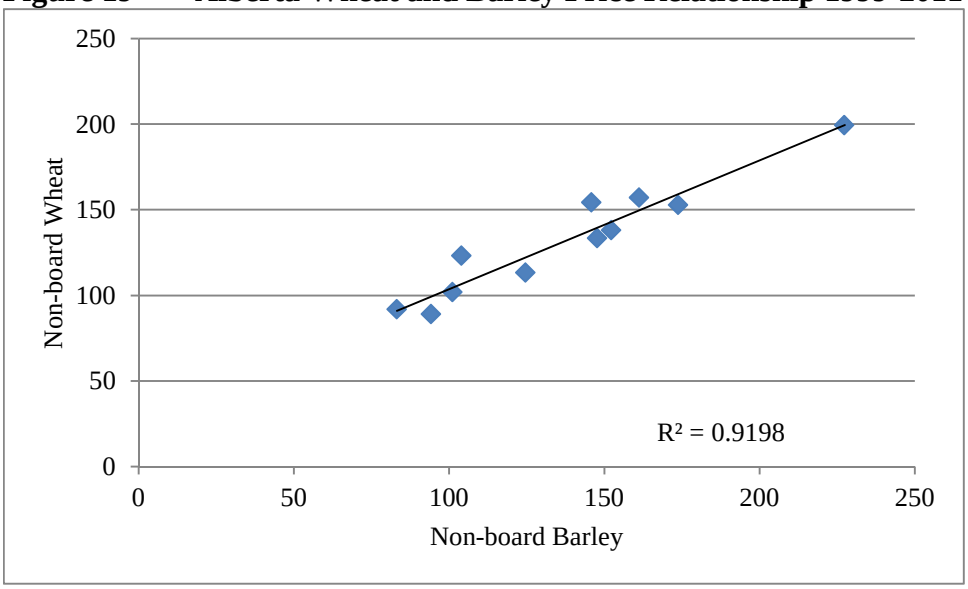
It is important to note that the impact in Ontario will be directly felt in Quebec. Quebec only has one ethanol plant that utilizes corn but, that one plant contributes to the regional corn price in the supply-demand balance. More importantly, this assertion is made given the fact that Ontario and Quebec are effectively one regional market. As such, even if Quebec did not have an ethanol plant, the price impact in Ontario would translate to Quebec.

Ontario's corn price averaged about $240/tonne in 2011. To reiterate, it is acknowledged that there are several factors that went into that price discovery and determination process including US prices, the exchange rate, corn supplies, gasoline prices and feed demand. With that noted, the assertion here is that it is likely that anywhere from $10-20 of that price was due to domestic ethanol demand.

3.3.2 Western Wheat

The discussion of ethanol versus livestock feed grains in the Prairies is less direct than in eastern Canada. Wheat is the primary feedstock of western ethanol, but barley is the primary feed of the livestock industry. With that noted, wheat and barley are ready substitutes in animal feeds. Furthermore, the prices of the two grains are closely correlated. A strong correlation exists between the prices of wheat and barley in Alberta when compared on an annual basis (Figure 19). The prices move together and the price changes in one result in changes in the other.

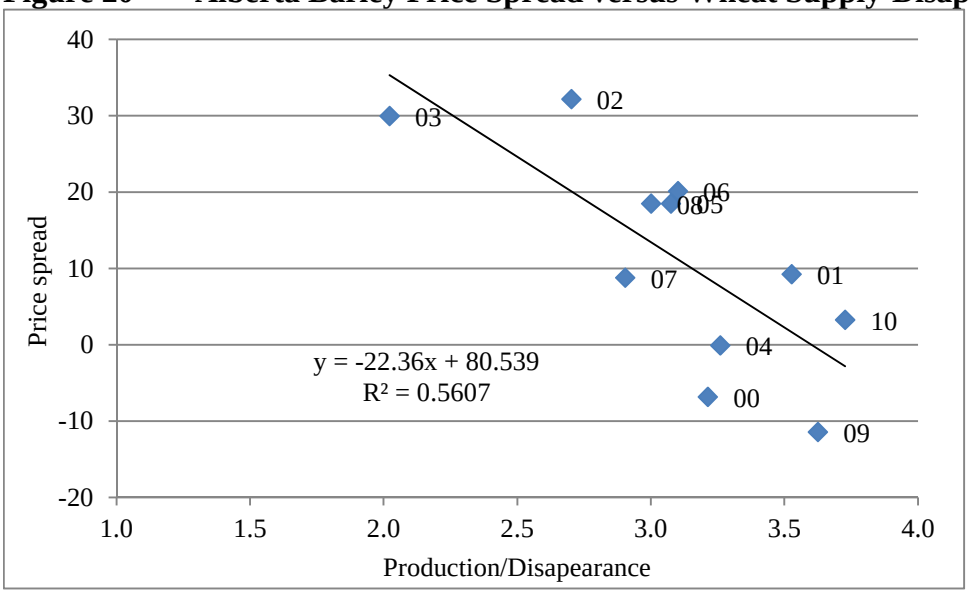
Figure 19 Alberta Wheat and Barley Price Relationship 1999-2011



Source: Statistics Canada Cansim Tables

The assertion therefore is that any development that causes price changes in the wheat market is going to have an impact on the barley market. The following graph shows the price relationship between the Alberta barley-Omaha Corn price spread and the production-domestic disappearance ratio for wheat. The points on the graph are the years in which the relationship occurred.

Figure 20 Alberta Barley Price Spread versus Wheat Supply-Disappearance



Source: Statistics Canada and Canfax

As can be seen there is a relationship between the production/disappearance of wheat and the barley price spread in Alberta versus the US. The demonstrated relationship is that the higher the production/domestic disappearance ratio the higher the price spread compared to the US. As with corn, the relationship is intuitive. The more that production is utilized domestically relative to supply, the higher the price is going to be domestically.

As with corn, the argument is therefore that the more that wheat is utilized domestically the lower the production/domestic disappearance ratio will be and the higher the price. During the past five years, as discussed above in section 3.2.2, ethanol has begun to significantly increase the domestic usage of wheat. The same methodologies of the P/D and price spread relationships used for corn above in section 3.3.1 can be applied to wheat to determine ethanol's impact. Based on the pricing relationship observed on the graph, it appears that the increased usage of wheat for ethanol increases the price barley spread by $5-10/tonne. This is about half the ethanol impact in Ontario, which is not surprising given the smaller share of wheat utilized for ethanol.

It is noted that the analysis above did not include 2011 data. The data for 2011 were not included because the Alberta price spread was at historically wide (that is low) levels relative to US corn and was regarded as an outlier, relative to past annual performance. This outlier argument is based on the fact that the spread went as wide as -$95/tonne in mid-2011 compared to the average of +$10/tonne over the previous ten years, as noted in section 3.1.2 above. The unusual year argument is due to 2011 supply and demand dynamics and the logistical challenges of arbitrage between US corn and western barely at any given time. The year finished as might be expected with the spread narrowing sharply. At this point it is argued that 2011 is an anomaly as opposed to a permanent market shift.

Alberta barley averaged about $200/tonne in 2011. As with Ontario corn, it is acknowledged that there are several factors that went into that price discovery and determination process including US prices, the exchange rate, western grain supplies supplies, gasoline prices and feed

demand. With that noted, the assertion here is that it is likely that anywhere from $5-10/tonne of that price was due to domestic ethanol demand.

4.0 Ethanol Impact on Livestock Production Costs

The previous section of the report examined the impact of Canadian ethanol production on grain prices in Canada. Section 2 made the conceptual economic argument of how ethanol-based grain price increases can impact livestock markets. This section takes the next step to determine the actual impact of those grain price increases on the cattle and hog industries in Canada. That is this section will test the theory espoused in section 2.

4.1 Cost Impact on Hogs and Cattle

4.1.1 Hogs

Feed is the largest component of livestock production costs. The share of feed to total production costs can vary from 50-75% depending on a variety of factors, but mostly on feed prices. According to budgets developed by Manitoba Agriculture, Food and Rural Initiatives, feed comprised about 56% of total costs of production in May 2010. Changes in feed costs have a direct impact on costs and production margins. The following table provides a simple example of the impact of corn price changes on the total cost of production (COP) for Ontario and Alberta. The table is based on cost of production models developed by the George Morris Centre.

Table 2 Grain Price Impact on Hog Production Costs

Ontario			Alberta		
Corn Cost	Hog Cost		Grain	Hog Cost	
$/tonne	/Ckg	/Hog	$/tonne	/Ckg	/Hog
150	146.28	140.43	150	127.90	122.79
175	153.84	147.69	175	134.00	128.64
200	161.39	154.94	200	140.10	134.50
225	168.95	162.19	225	146.20	140.35
250	176.51	169.45	250	152.30	146.21
275	184.06	176.70	275	158.40	152.07
300	191.62	183.96	300	164.50	157.92

Source: George Morris Centre Hog COP

Based on the data in the table above, it can be generalized that for every $25/tonne increment in feed costs, total costs increased by over $7.25/hog in Ontario and $5.85/hog in Alberta or the Prairies.

As noted in the section 3.3 ethanol could have had a regional grain price impact of about $17/tonne in the east. Applying this, the corn cost impact on Ontario hogs translates to about $4.90/hog. Also as noted in the section 3.3 ethanol could have had a regional grain price impact

of about $5-10/tonne in the West. Based on the grain cost impact on western hogs, using $7/tonne, the increase translates to about $2/hog in western Canada.

4.1.2 Cattle

The George Morris Centre also has a cost of production model for Ontario cattle while Canfax publishes a cattle model for the west called Trends. It is assumed that typical weight gain on feed will amount to about 500 pounds. Utilizing the Ontario model, it will take just over 2 tonnes of corn to put on 500 pounds of gain, so a $25 per tonne increase in feed cost would increase COP by about $50.

Based on Trends data it takes at least 1.77 tonnes of barley to put on the 500 lbs. of gain. The following are examples of price and cost sensitivity for barley:

- At Lethbridge $212/tonne, barley cost per head is $375.25.
- At $237/tonne, barley cost is $419.50/head for a difference of $44.25.
- At $187/tonne, barley cost is $330.99/head for a difference of $44.25.

The increase in feed cost/head due to a $25/tonne increase in barley cost is about $44.00.

Focusing on Ontario, and the estimated ethanol impact of $17/tonne, it suggests that ethanol has added about $34/head to Eastern Canadian cattle feeder's costs. In the west, it was illustrated that ethanol could have boosted western feedgrain prices by about $7/tonne. That $7/tonne increase translates to over $12 per head in added costs to western cattle feeders.

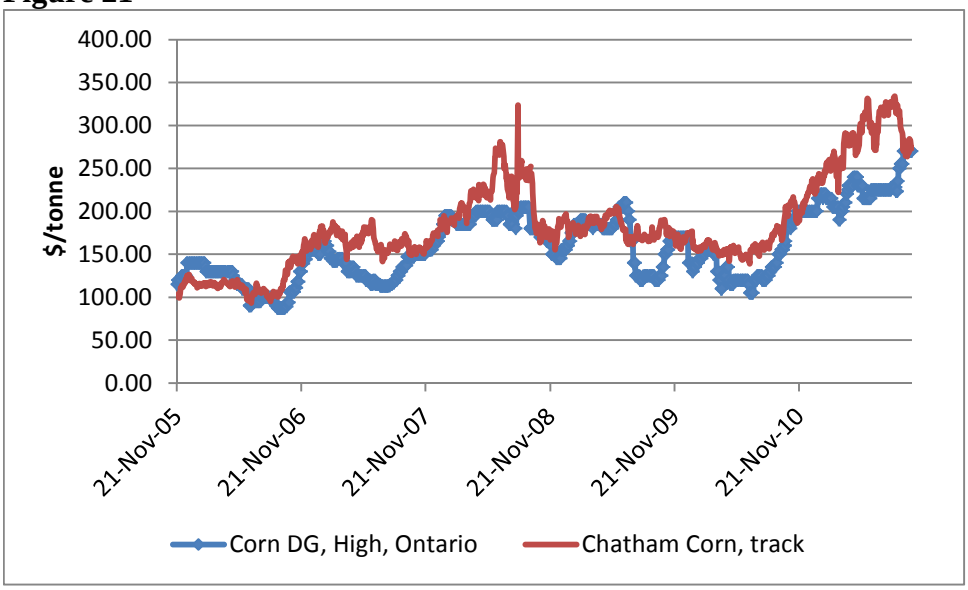
4.1.3 Distillers Grain Factor

The above focuses on the grain price effects of ethanol production. It does not directly consider the impact of increased production of DDG's that result as a byproduct of ethanol production. In understanding the impact of ethanol on livestock and meat production, the effect of the distiller's grain (DG) byproduct should be understood. According to NRC feed standards, corn DG is about 31% protein and wheat DG is about 45% protein. The metabolizable energy in corn and wheat DG is generally comparable to corn and feed wheat for hogs; energy in corn and wheat DG is generally lower compared to corn and feed wheat for cattle (Mussell et al, 2007). At an inclusion rate of 20% of dry matter, Mussell et al (2008) found that feeding corn DG decreased the corn requirement in a cattle ration from about 2 tonnes/head to 1.73 tonnes/head. In a study of western feed grains, Mussell et al (2007) observed that full (20%) inclusion of DG in western Canada decreased hog and cattle feed costs by 1-4%.

Thus, the production of DG as a feed byproduct is of material benefit in livestock feeding, and as ethanol production has expanded, its supply and price has declined. However, this benefit must be small in relation to the increase in the basis for corn/barley/feed wheat. This is because of its limited inclusion rate- if 20% inclusion is used as a benchmark, then, as primarily a dietary energy source, on a dry matter basis, DG would need to decrease in price at 5 times the rate at which the local feed grain price strengthens due to ethanol in order for livestock to be unaffected- in terms of local cost competitiveness. That this appears not to have occurred is evident in Figure 21 below. The figure plots Ontario corn and corn-DG prices at Chatham from the fall of 2005 to 2011. It does not indicate a major decrease in the relative price of corn-DG to

corn since the major expansion in ethanol production in Ontario post-2007; certainly not of the magnitude described above.

Figure 21



4.2 Total Cattle and Hog Production Cost Impact

The following table summarizes cattle and hog marketing numbers in eastern and western Canada over the 2006-10 period.

Table 3 East and West Cattle and Hog Marketings

2006-2010 Average	**Exports**	
	Hogs	Fed Cattle
West	1,285,714	295,168
East	734,693	78,616
	Slaughter	
	Hogs	Fed Cattle
West	8,027,666	1,946,243
East	12,504,158	588,900
	Marketing	
	Hogs	Fed Cattle
West	9,313,380	2,241,411
East	13,238,852	667,516

Source: Agriculture and Agrifood Canada (AAFC) Red Meat Section

Over last five years, hog slaughter in eastern Canada has amounted to 12.5 million head annually. Over the same period, eastern Canada shipped over 700,000 head on average to the

US. Total eastern marketings therefore have amounted to 13.2 million head on average. Using the estimated ethanol related added costs of $4.90 per head, this means that ethanol is adding about $65 million in total costs to eastern Canadian hog marketers annually.

Western hog slaughter has averaged about 8 million head while slaughter exports have amounted to 1.3 million for total marketings of 9.3 million per year. As noted above, in western Canada it is estimated that ethanol adds up to $2/hog in costs. Total ethanol related added costs in the west amount to at least $15 million per year. The Canadian total for the hog industry amounts to over $80 million per year.

Eastern steer and heifer slaughter has amounted to 589,000 head during the past five years while eastern exports of slaughter steers and heifers has been about 79,000 head. As such total marketings amounted to approximately 668,000 head. The ethanol induced cost increase amounts to about $34/head for a total eastern cattle cost of $23 million.

Western steer and heifer slaughter has amounted to about 1,946,000 head while western exports of slaughter steers and heifers has been around 295,000 head. Total marketings amount to 2.24 million head. Based on the ethanol related costs per head of $12, the total ethanol induced cost increases amount to $28 million.

The following table summarizes the marketing and ethanol related costs for the Canadian cattle and hog industries. As can be seen on Table 4 the total costs to the livestock industry amount to over $130 million per year.

Table 4 Total Ethanol Induced Livestock Cost Estimates

	$/head	Total
Western Canada Hog Marketings (Million Head)		9.3
Western Canada Hog Ethanol Impact ($ million)	1.6	$ 15.0
Eastern Canada Hog Marketings (Million Head)		13.2
Eastern Canada Hog Ethanol Impact ($ million)	4.9	$ 65
Western Canada Cattle Marketings (Million Head)		2.2
Western Canada Cattle Ethanol Impact ($ million)	12.3	$ 28
Eastern Canada Fed Cattle Marketings (Million Head)		0.7
Eastern Canada Cattle Ethanol Impact ($ million)	34.0	$ 23
Total Hog and Cattle Ethanol Impact ($ million)		**$ 131**

Source: AAFC and George Morris Centre Estimates

4.2.1 Perspective

The ethanol impact of about $130 million needs to be taken into perspective. The total is relatively small compared to the fact that the cattle and hog industries have combined farm income in the $9 billion range. These industries however operate on a margin basis. According to George Morris Centre cost of production models, during 2010, the most efficient hog producers in Canada might have averaged about $10/head in positive margins. In 2011 margins were probably about $5/head. Those margins could have been $2/head and $4/head higher in the

west and east respectively without the ethanol induced costs. During 2009, even top producers in Canada experienced losses of over $30/head. Ethanol induced grain price increases made those losses worse than would have otherwise been the case.

In 2010, Canfax estimates that western cattle feeders generated over $26/head in positive margins on feeding yearlings. Margins in 2011 will likely be similar to 2010. Those margins were reduced by about $12/head due to ethanol. In other words, due to ethanol's impact on grain prices and feeding costs, as discussed above, cattle feeders could have generated margins of nearly $40/head ($26+12). By the same logic, in 2009, cattle feeding margins were negative by nearly $40 of which ethanol's contribution was about $12.

As stated earlier, there is no way to pinpoint an exact dollar ethanol impact due to the wide variety of market factors. Nevertheless, as shown and as would logically be expected, ethanol production does impact local and regional grain markets in Canada. The order of magnitude of Canadian ethanol production suggested by this research is entirely plausible.

5.0 Ramifications for Canadian Livestock

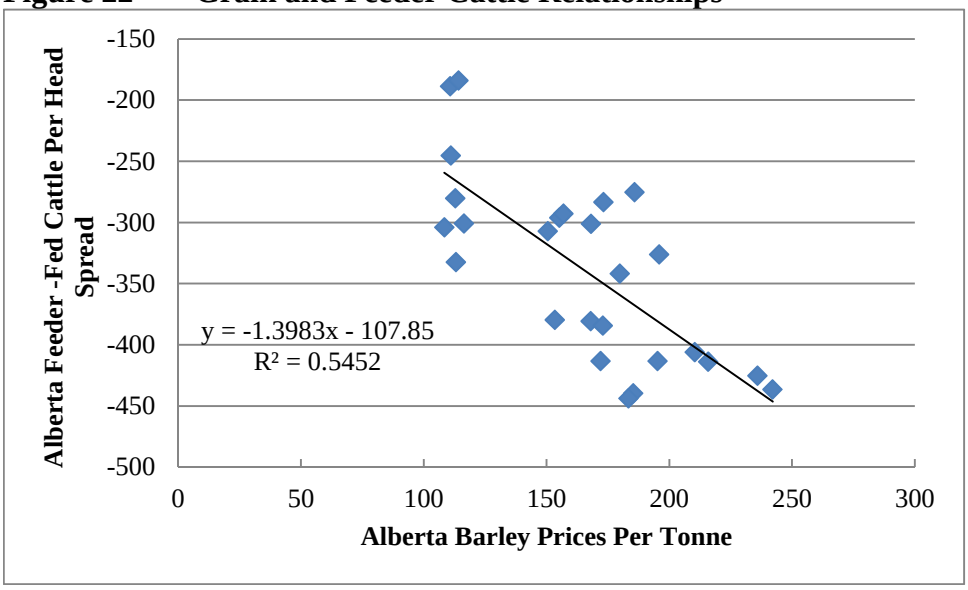
The previous section examined the likely cost impact of the ethanol industry on the Canadian cattle and hog sector. This section of the report addresses ramifications and consequences of those Canadian ethanol cost increases on the livestock industry in Canada.

5.1 Cattle

5.1.1 Feeder Cattle Prices

As noted in section 2 feeder cattle values are a derived price based on fed cattle prices and the cost of grain. Higher/lower fed cattle prices will result in higher/lower feeder cattle prices. Conversely, higher/lower grain prices will result in lower/higher feeder cattle prices. After grain costs and anticipated finished cattle revenue, the funds left over become the feeder price. The theory discussed in section 2 stated that a higher relative grain basis will drive down feeder livestock prices and also result in lower production in the effected region. The following graph examines that assertion. The graph shows the relationship between Alberta barley prices and the value per head spread between feeder cattle and fed cattle in Alberta on a quarterly basis from 2005 through June 2011.

Figure 22 Grain and Feeder Cattle Relationships



Source: Canfax

The graph shows that the higher the local grain price, the lower the value of feeder cattle per head compared to fed cattle. The higher the grain price the greater the differential. In other words, the higher the grain price, the lower the feeder cattle value relative to the finished cattle. The graph shows that there is a definite relationship between local grain prices and local feeder cattle prices.

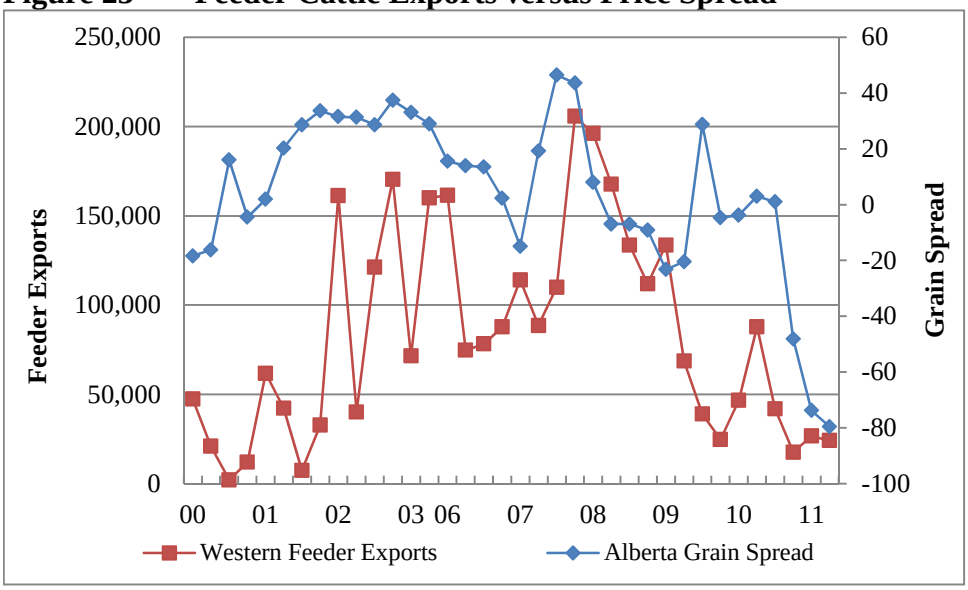
Given that local grain prices impact local feeder cattle prices, then the attention obviously turns back to the ethanol related impact on local grain prices. Ethanol drove up local grain prices by some amount approaching $17/tonne in the east and $7/tonne in the west. That in turn meant that cattle feeding margins were reduced by around $34/head in the east and $12/head in the west. That simply means that cattle feeders were able to pay less by those amounts in order to at least break even.

Once again, it needs to be recalled that there are numerous factors that go into livestock pricing such as livestock supplies, meat demand, economic conditions and grain prices. That is, local ethanol is far from the only influence. Furthermore, the assertion here is not that the feeder markets in the east or the west were discounted by exactly those amounts. Instead the argument is that feeder markets have, nevertheless, been negatively affected by ethanol. Cow calf operators are receiving lower incomes and prices due to ethanol in some magnitude approaching $34 and $12/head in the east and west.

5.1.2 Feeder Cattle Exports

The theory in section 2 states that higher grain prices due to ethanol will impact the grain basis and thereby reduce the ability of local cattle feeders to purchase cattle. Higher local grain prices relative to competing regions means that those competing regions will increase their purchases of the higher grain priced region's cattle. The following graph shows the trend in western feeder cattle exports and the price spread between Alberta barley and Omaha corn on a quarterly basis from 2000 to mid-2011. The graph does not include the BSE year quarters of 2003-2005 in which cattle could not be exported.

Figure 23 Feeder Cattle Exports versus Price Spread



Source: Canfax and AAFC Red Meat Section

As can be seen, early in the decade when the grain price spread was rising relative to the US, feeder cattle exports increased. Later in the decade as the spread declined and Alberta feed prices were relatively low, exports decreased.

The relationship between the spread and feeder exports is crude but it does exist. The R-squared between the spread and feeder exports is 27% on an annual basis over the past decade, not including the BSE years. That means that only 27% of the variation in feeder exports is caused by the spread. That in turn means that there are other factors at work that influence exports as would be expected. Those other factors include expected fed cattle prices locally or in the US as well as feedlot capacity and feeder cattle supply.

Nevertheless the data correspond to the theory and the common sense concept that higher local grain prices versus other regions make local cattle feeders less competitive. Again the assertion here is that the fact that ethanol drives local grain prices higher relative to competing regions makes Canadian cattle feeders less competitive. That in turn leads to a loss of feeder cattle purchases and subsequent feeding locally, relative to what would have occurred without the ethanol presence.

It is acknowledged that the entire North American feed cost structure has been raised due to ethanol production in the U.S. and its associated impacts on U.S. demand for cattle due to higher feed costs in the U.S. With ethanol policies in both countries the entire water level has been raised so the question is to what extent does U.S. policy limit demand for Canadian cattle? It is also worth asking to what extent is the Canadian impact from ethanol larger than the U.S. impact? These factors all come into play and are part of the reason why the R-squared is relatively low. With that noted, the assertion here is simply that the local grain spread is negatively related to feeder exports. The statistical relationships show there is a local spread

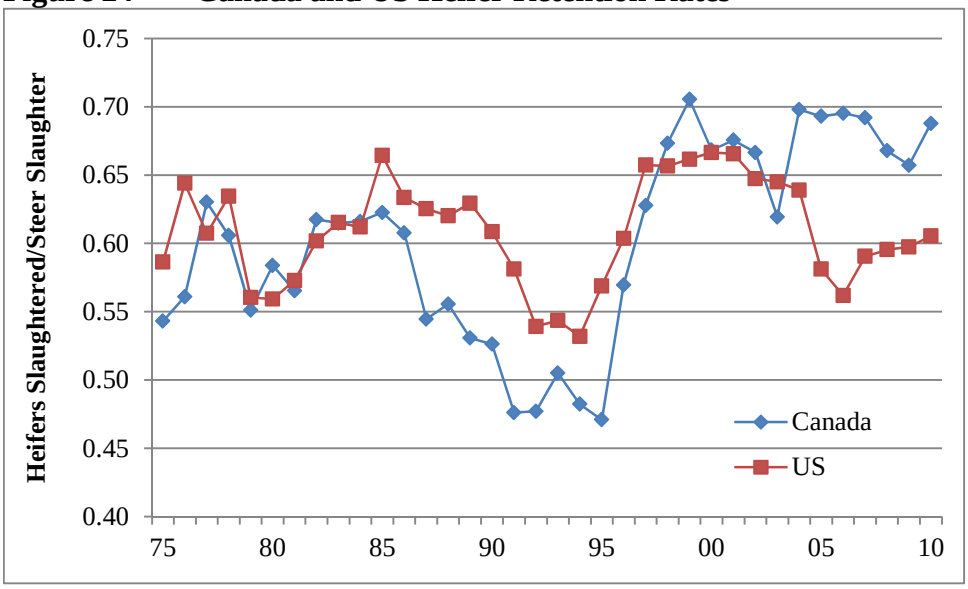
impact, in addition to the other factors at play. To the extent that ethanol production in Canada impacts the grain spread, it has an impact on feeder exports, as would logically be expected.

5.1.3 Heifer Retention and Herd Rebuilding

Data pertaining to beef heifer retention or slaughter can indicate the willingness or ability of the cattle industry to expand or contract. The Canadian herd has been contracting for the past six years and the contraction is expected to continue into 2012. The reasons for the shrinking herd are many and varied including the appreciation of the Canadian dollar, ranching demographics and of course margins. With regard to margins, the increased cost of grain during the past four years has played a critical role in reducing producer margins and producer profit expectations.

The heifer retention rate, which is defined as the ratio of heifer slaughter to steer slaughter, has shown significant divergence between Canada and the United States in recent years. The greater the ratio, the greater the contraction or at least, the less chance there is for expansion. The following graph shows the ratio of heifer slaughter to steer slaughter in Canada compared to the US.

Figure 24 Canada and US Heifer Retention Rates



Source: USDA NASS, AAFC RMS

As noted, higher grain prices have resulted in reduced profit margins and expectations. To the extent that ethanol has resulted in higher relative grain prices in Canada, it has contributed to the shrinking of the Canadian cattle herd.

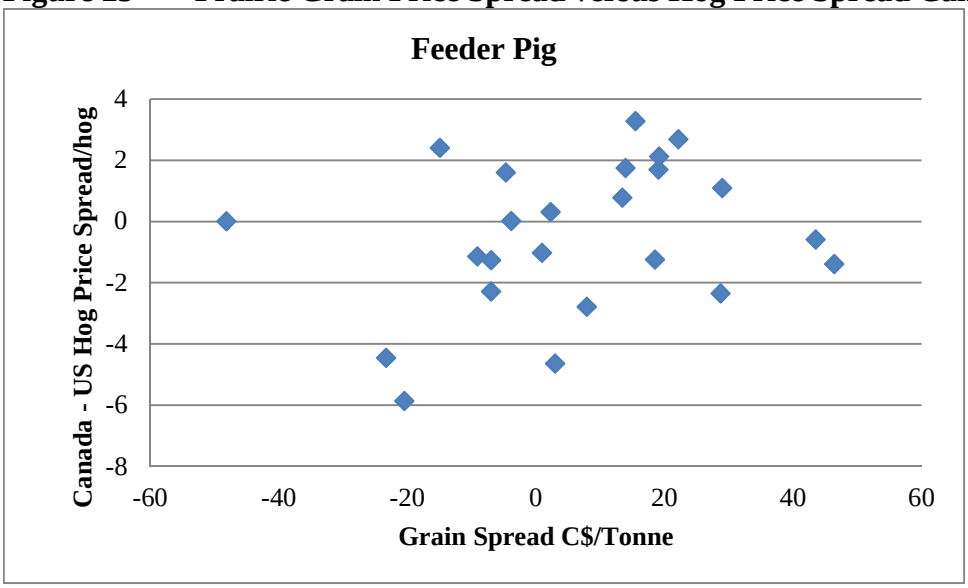
Again, as with all impacts, ethanol is not the only factor in this development. Other factors have also been at play such as an appreciated Canadian dollar, labour costs, demand limitations due to market access limitations for beef and cattle, COOL, etc. All of these are important but the point is to note that to the extent that ethanol increases grain costs for Canadian producers, then it must be included as a contributing negative factor.

5.2 Hogs

5.2.1 Feeder Hog Prices

As noted, the expectation is that grain prices are bid into feeder livestock prices such that the higher the local grain price, the lower the local feeder livestock price. That was demonstrated to be the case in feeder cattle. The statistics are far less clear for feeder hogs. The following figure shows the relationships between the western barley price spread with US corn versus the spread between Prairie feeder pigs and US feeders on a quarterly basis from 2005 to the end of 2010. The vertical axis shows the price differential between Canadian feeders and US feeders each quarter. The feeder price differential fluctuates over and above $0/head, regardless of the grain price differential between the Prairies and the US. In other words, as can been seen on the graph, there is no apparent relationship between the grain spreads and feeder pig spreads.

Figure 25 Prairie Grain Price Spread versus Hog Price Spread Canada-US



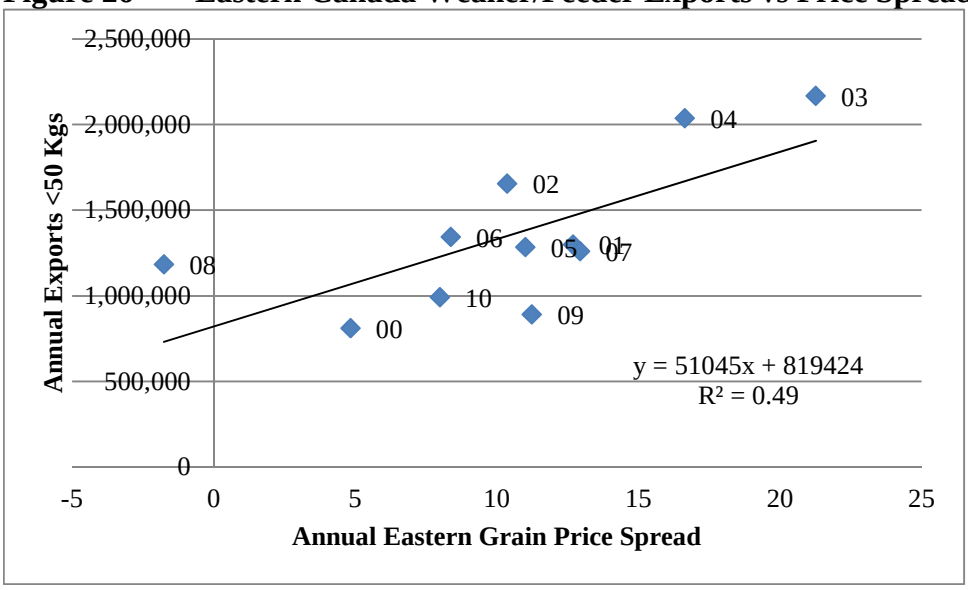
Source: Hog Prices Phoenix AgriTech, Grain Price Canfax

The fact that there is no obvious relationship between grain prices and feeder pig prices is not particularly surprising. Unlike feeder cattle, feeder pig and weaner prices have an almost formulaic relationship to lean hog futures. This of course does not mean that grain prices do not impact weaner and feeder demand. The higher the grain price, the lower the break-even price for weaners and feeders. Again, if it is taken as a guide that ethanol increases hog production costs by $2-4/head across Canada relative to the US, it means that Canadian hog finishers are less competitive compared to their US counterparts.

5.2.2 Weaner and Feeder Pig Exports

If Canadian finishers are less competitive due to the impact of ethanol on feed prices, it should result in a loss of weaner and feeder pigs and production in Canada. The following graph shows annual weaner and feeder pig exports from eastern Canada in relationship to the eastern Canadian grain price spread.

Figure 26 Eastern Canada Weaner/Feeder Exports vs Price Spread



Source: AAFC Red Meat Section and Cansim

The graph shows that there is a statistical relationship between the price spread and exports of weaners and feeders. The data shows that the higher the price in eastern Canada compared to the US, the greater the exports. Of course, as in all aspects of the industry, there are other factors at work that drive exports.

In the west there is little or no relationship between the grain price spread and exports. The fact that there is not a strong statistical relationship in the west does not mean that the local grain price is not important in determining western competitiveness. It simply means over the past ten years, there have been other factors that have influenced export more than grain pricing. For example the 2004/5 Countervail and Anti-dumping case or the 2008 implementation of Country of Origin Labelling both played major roles.

The relative clarity of the export and grain spread relationship in the east again supports the argument that as ethanol drives the local grain spread higher, it results in the loss of feeder animals to other, more feed- competitive regions.

The next section of the report looks at other implications of existing and potential ethanol blend policy requirements

6.0 Implications of New and Existing Blend Requirements

This section examines the grain usage issue from the perspective of ethanol production and mandates. It reviews some of the supply and disposition data already presented in section 3 and provides additional insights into what would occur with expanded mandates and ethanol production.

6.1 Gasoline and Ethanol

The full implication of blend requirements will develop over time as new capacity comes on line to satisfy provincial and federal biofuel blend mandates. To put this in context, the metrics of gasoline consumption and ethanol production relative to it must be understood. Table 5 shows that nationally, gasoline consumption has recently ranged around 39 billion litres. The federal blend standard currently is 5%; this means that, using 2006-10 averages, the output of ethanol required is about 1.96 billion litres. A move to a 10% blend, such as exists in the US, would double the required ethanol output to about 3.9 billion litres.

Table 5 Motor Vehicle Gasoline Consumption in Canada

	Thousand Litres
2006	38,653,955
2007	39,635,182
2008	39,148,560
2009	39,736,092
2010	40,558,727

Source: Statistics Canada Cansim, Gasoline on which tax was remitted

6.1.1 Ethanol Feedstock

Table 6 below puts these volumes in context. The rows of the table represent the current and prospective blend requirement. The columns consider the use of feedstocks to supply this blend requirement.

Table 6

		Assuming blend satisfied with, alternatively, all corn, or all wheat		Assuming blend satisfied with corn and wheat in proportion to existing capacity	
	2006-10 Average, Thousand Litres	Implied Corn Consumption (tonnes)	Implied Wheat Consumption (tonnes)	Corn (tonnes)	Wheat (tonnes)
Net sales of gasoline	39,546,503				
5% Ethanol Blend	1,977,325	4,831,559	5,344,122	3,070,079	1,948,349
10% Ethanol Blend	3,954,650	9,663,119	10,688,244	6,140,159	3,896,698

The first set of columns represent the counterfactual, in which either only corn, or only wheat were used as feedstock to supply ethanol to satisfy the blend. This is counterfactual because in practice, a mix of corn and wheat sources will be used to make ethanol, and capacity to use both feedstocks already exists. The second set of columns assumes that a mix of corn and wheat will be used to supply the required ethanol, in proportion to current and announced plant capacity for plants using corn and wheat respectively. Ethanol plants in Ontario and Quebec have a nameplate capacity of about 1.23 billion litres, and plants in western Canada predominantly using wheat have (or will have) nameplate capacity of 704 million litres. Thus, the ratio of capacity based on corn is 1.23/1.93, or about 63.5% with the wheat share 36.5%.

The results in the table show the implications of the federal 5% blend mandate. The mandate creates the demand for the equivalent of either 4.8 million tonnes of corn, or from 5.3 million tonnes of wheat. A 10% blend would require 9.6 million tonnes of corn (if it were the sole feedstock), or 10.6 tonnes of wheat. The reality is that a combination of corn and wheat will be used as feedstocks, and while the ultimate mix of corn-based versus wheat-based plants can only be the subject of speculation, we use the current distribution as a guide. At a 5% blend, just over 3 million tonnes of corn are required along with just over 1.9 million tonnes of wheat. At 10% blend, the implication is a requirement for about 6 million tonnes of corn and 3.85 million tonnes of wheat.

This must be understood in the context of total corn and wheat production to be fully appreciated. Table 7 presents Canadian corn production (essentially Ontario and Quebec, with small production in Manitoba) and western Canadian wheat production. The table shows that corn production in the last five years has increased markedly up to almost 12 million tonnes, and has averaged just over 10 million tonnes in the last five years.

Table 7 Canadian Corn and Western Canadian Wheat Production

	Corn 000 MT	All Wheat 000 MT
2000	6,954	24,891
2001	8,389	19,227
2002	8,999	14,364
2003	9,587	20,599
2004	8,837	22,889
2005	9,332	23,766
2006	8,990	22,439
2007	11,649	18,391
2008	10,592	25,493
2009	9,561	24,646
2010	11,715	21,038
2006-10 Average	10,501	22,401

Table 8 relates the consumption estimates of corn in combination with wheat to total production of corn and wheat, at the two blend mandates. The table shows that, under the assumption that the federal mandate is filled using corn and wheat in proportion to existing capacity, at a 5% blend mandate about 29% of Canadian corn production and about 9% of wheat is consumed in making ethanol. Alternatively, under the 10% mandate, approximately 59% of corn production is consumed in ethanol production, and just over 17% of the wheat.

Table 8 Implications of Prospective Corn and Wheat Utilization to meet Ethanol Mandates

		Corn	Wheat
Average Annual Production	Tonnage	10,501,400	22,401,469
5% Federal Blend	Prospective Tonnage	3,070,079	1,948,349
	Percentage of Production	29.2%	8.7%
10% Federal Blend	Prospective Tonnage	6,140,159	3,896,698
	Percentage of Production	58.5%	17.4%

6.2 The Challenge of an Expanded Mandate

The proportions of corn and wheat consumed, especially under the higher mandate, are significant relative to the other uses of corn and wheat. At high proportions of corn utilization, corn will need to be redirected away from livestock in eastern Canada- both red meat livestock and supply-managed livestock. Table 9 below provides the context for this pertaining to corn in eastern Canada.

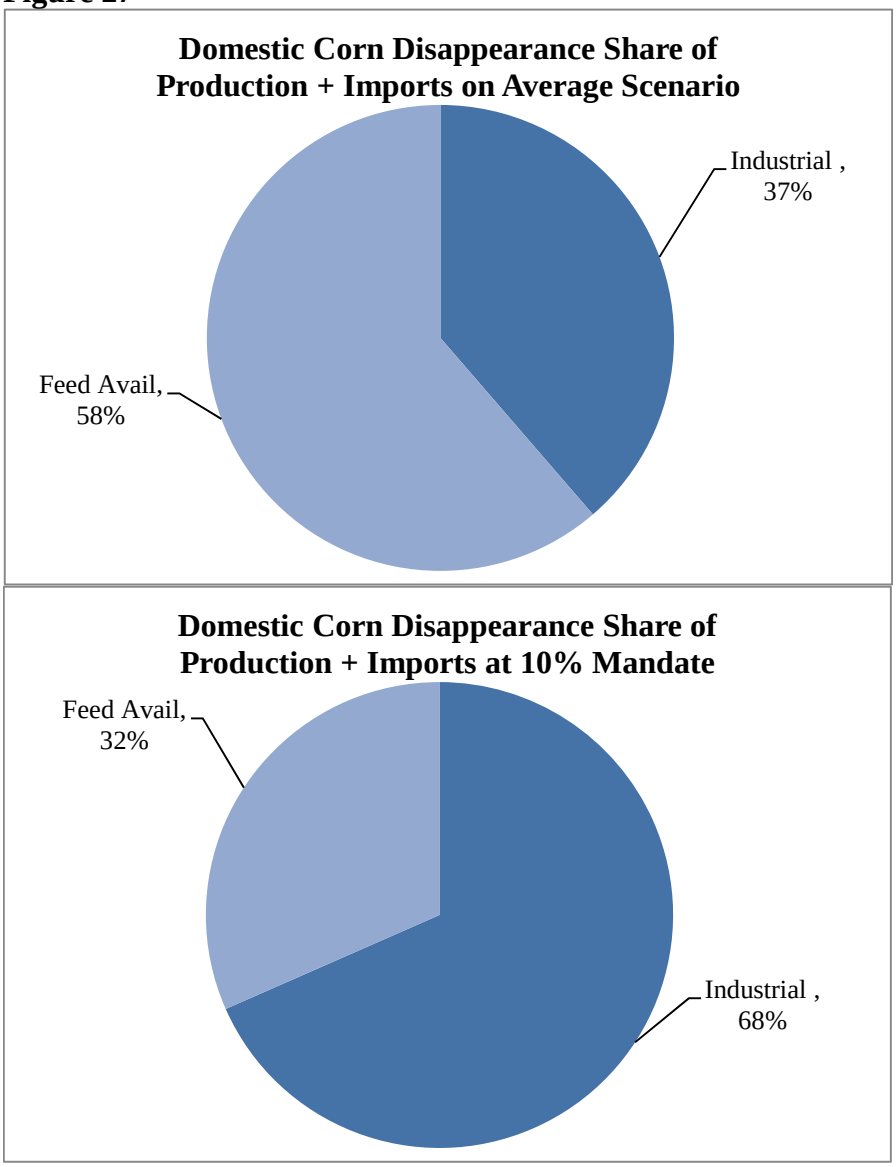
Table 9 Corn Feed Availability Scenarios, Tonnes

	Imports	Production	Total Supply	Food/Industrial	Feed Avail	Feed Diff from Avg
09-11 Avg	1,642	10,623	12,265	4,488	7,116	
share of supply				37%	58%	
5% Mandate	1,642	10,623	12,265	5,388	6,877	(240)
share of supply				44%	56%	
10% Mandate	1,642	10,623	12,265	8,388	3,877	(3,240)
share of supply				68%	32%	

The most recent three year average of the corn supply and use shows that there was about 7.1 million tonnes used for feed in eastern Canada out of total supply of about 12.3 million tonnes, or about 58%. Under the 5% mandate given the current corn and wheat proportions used to make ethanol, about 3.1 million tonnes would be used, boosting food and industrial usage to 5.4 million tonnes and reducing feed availability to just 56% of average supply.

If a 10% mandate became law, as in the US, and if corn were utilized to meet that mandate in the current corn and wheat proportions, as noted above in Table 8, 6.1 metric tonnes of corn would be used to make ethanol, boosting food and industrial utilization to about 8.4 million tonnes. Again assuming average supplies, this would drive down feed availability to 3.9 million tonnes. The following graph shows the shares of feed and food/industrial under average and the 10% mandate conditions.

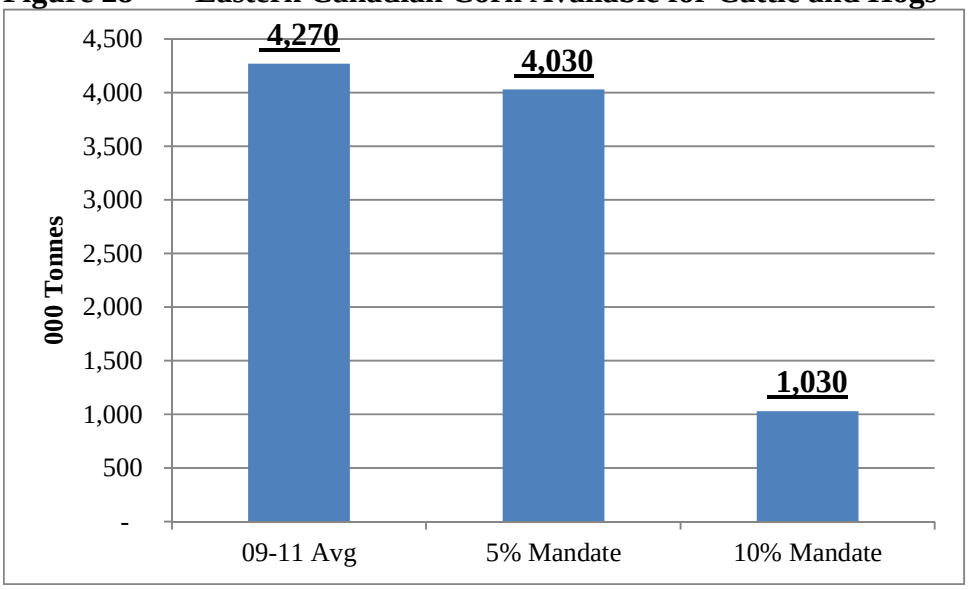
Figure 27



Reaching current and the potential 10% mandate have important ramifications for the cattle and hog industry in eastern Canada. In terms of feed availability, it is reasonable to assume that the supply managed sectors will be inherently competitive for feed grains that they need due to their market leverage. Supply managed sectors use about 40% of the grain corn in eastern Canada. It also assumed that the non-ethanol industrial users will attain their needed supplies. That latter assumption is less of a given than the supply managed assumption. Nevertheless, it is much more plausible that cattle and hogs will be the residual as opposed to industrial food users of corn.

The following graph shows the amount of feed available for cattle and hogs under those assumptions.

Figure 28 Eastern Canadian Corn Available for Cattle and Hogs



Clearly a move to a 10% mandate will decimate the cattle and hog sector in eastern Canada. Even if record production and imports are assumed, the industry would need to rationalize by up to 40% to conform to available feed supplies.

Admittedly, the discussion above and the numbers in table 9 and the graphs are draw upon scenarios and "what-ifs." While that is true, the numbers and orders of magnitude are plausible and realistic. They demonstrate what could happen and the scope. The main message is that moves to the 10% mandate would result in a very large loss of cattle and hog production in Ontario and Quebec.

Similar scenarios are not as likely on the Prairies given that wheat and barley exports are about two times greater than feed use for the two crops. In other words, the supply situation in the west does not make cattle and hog production vulnerable under a 10% mandate. The western livestock industry would however, continue to suffer under an increased price impact.

A caveat to be observed here is that the combination of corn and wheat used can be criticized as arbitrary. In fact, using existing corn ethanol and wheat ethanol capacity as a point of departure, a wide range of proportions of corn and wheat could be used to fill ethanol blend mandates. The point is that regardless of the proportions, at higher ethanol blend levels the proportional use of corn and wheat will be very high, shorting other uses.

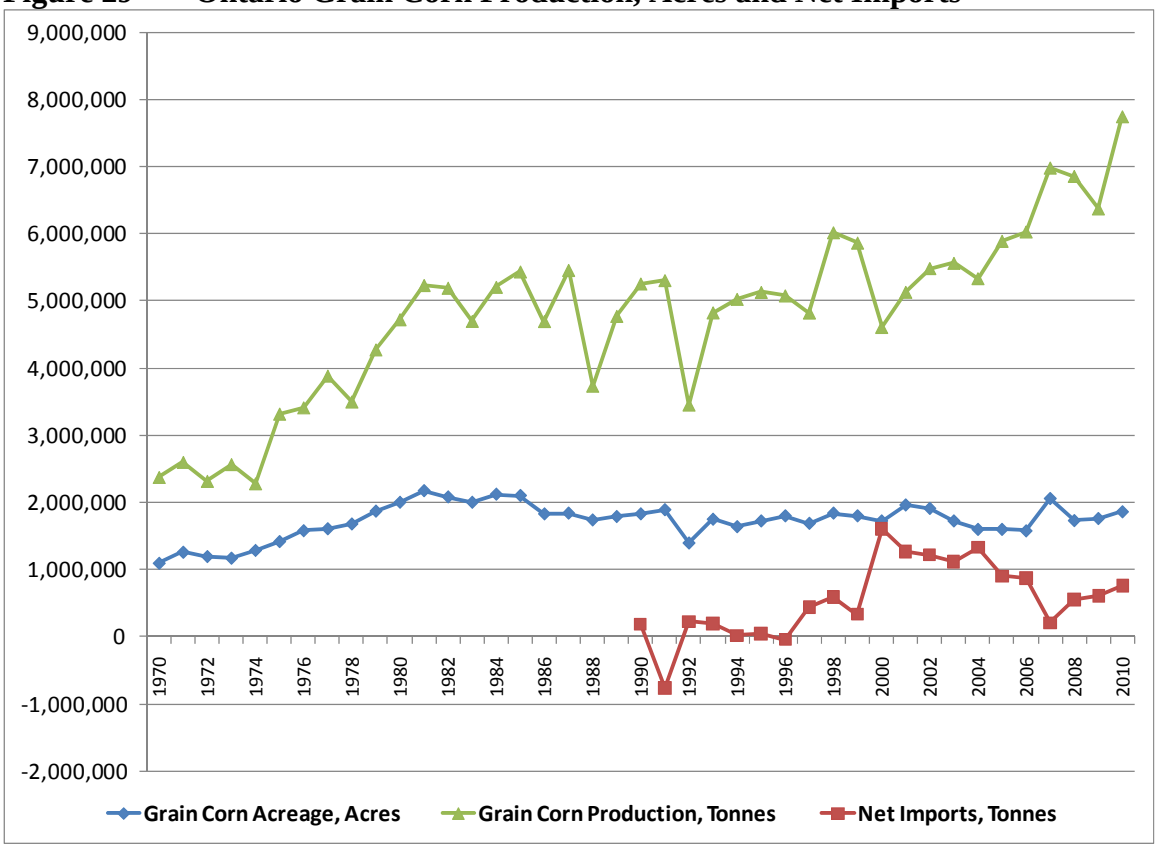
Finally, it should be acknowledged that the above does not account for yield growth or changes in acreage in response to biofuel demand. Corn yield growth in Ontario has been just under 2% per year and yield growth in western Canadian wheat was 1.1% per year over the period 1990-2010. So, while yield growth is occurring (especially in corn), additional production to serve ethanol mandates based on yield growth alone would only allow very gradual implementation of biofuel mandates, and this is not what is envisioned. Acreage growth in grain corn has been mostly in Manitoba and in Quebec; in Ontario (with approximately two thirds of the acreage),

corn acreage has been essentially constant at just under 2 million acres, regardless of Ontario ethanol demand.

Further to that point, the conceptual model suggests that the corn supply response effect of ethanol development in Ontario is likely to be sharply limited. This is because there is free trade with the US in corn, so the effective range of corn price effect attributable to Ontario ethanol development is the basis, which is typically a small proportion of the overall corn price, typically tied to the cost of transportation. In other words, there isn't an economic rationale to expect a substantial increase in Ontario corn production due to Ontario ethanol development.

The basic evidence of supply response in a grain crop is acreage. Farmers also respond by increasing fertilizer applications, changing technology, etc. but this is secondary to acreage adjustment. As the figure 29 below shows, there has been little apparent change in Ontario corn acreage, including since 2007 that is indicative of a supply response. Ontario corn production increases have been almost solely yield-based.

Figure 29 Ontario Grain Corn Production, Acres and Net Imports



Source: OMAFRA, Grain Farmers of Ontario

The same general trend can be expected in western Canada. While Canada is a much larger player in world wheat and barley markets, the incremental effects of ethanol development in western Canada will affect the price basis, not the world price. As with corn, the price and basis adjustment effect is bound by transport costs and imports from the US, which is a relatively small proportion of the price of western barley of feed wheat. So the supply response that is attributable to ethanol development in western Canada is likely to be very limited.

7.0 Livestock and Meat Industry Contribution

This section of the report provides a basic descriptive sketch of the Canadian beef and pork industries. The section also provides a description of a model ethanol plant revenue and cost dynamic. The purpose of that description is to provide a contrast with the livestock and meat industry.

The trials of the red meat industry in Canada have been well documented. The industry has struggled over the past seven years through the following challenges, among others:

- Animal health crises such as BSE
- Trade disputes including Country of Origin Labeling
- Doubling of grain prices and input costs
- Canadian dollar appreciation

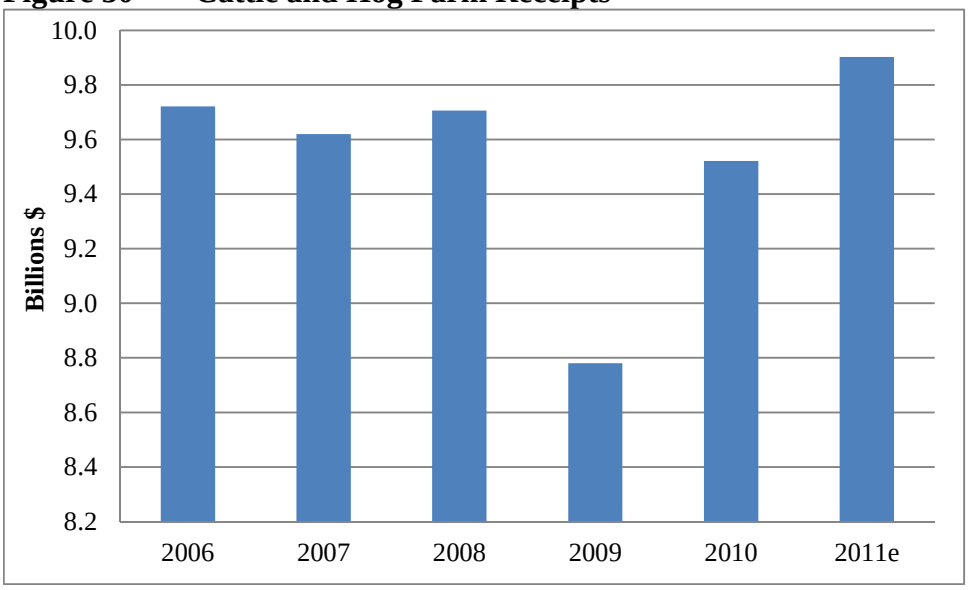
Any one of these issues would have been debilitating in itself, but the livestock and meat industry endured them simultaneously over these recent years. These exceptional industry problems resulted in severe losses, a rationalization of producers and processing plants. Despite the difficulties of the past, the industry has emerged and continues to make competitive adjustments. The following graphs provide an overview of the industry for 2011 as well as the previous five years.

7.1 Cattle and Hog Production

The cattle and hog production sector will generate farm cash receipts of just under $10 billion in 2011, up by about 4% over 2010. As can be seen on the graph below, 2011 sales will be the largest of the last six years.

The number of farms reporting hogs in Canada has declined by nearly 40% over the past six years from 2006 to 2011 and cattle farms declined by 14%. Despite those dramatic declines, the industry has managed to generate the increase in sales demonstrated on the graph below.

Figure 30 Cattle and Hog Farm Receipts



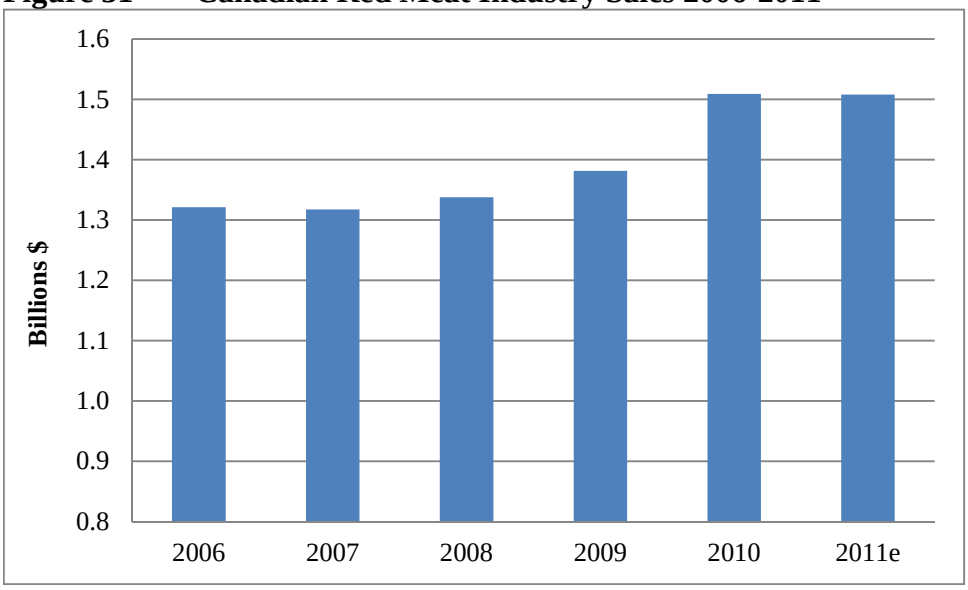
Source: Statistics Canada Cansim

7.2 Red Meat Industry

The red meat industry has sales of over $1.5 billion and the entire meat industry including poultry employs nearly 60,000 people in Canada. Of that 60,000 total, approximately two thirds would be in the beef and pork sectors. The red meat industry is the largest sector of the entire food industry in Canada. Over the past decade, meat industry sales, not including poultry, have represented 22% of total Canadian food industry sales.

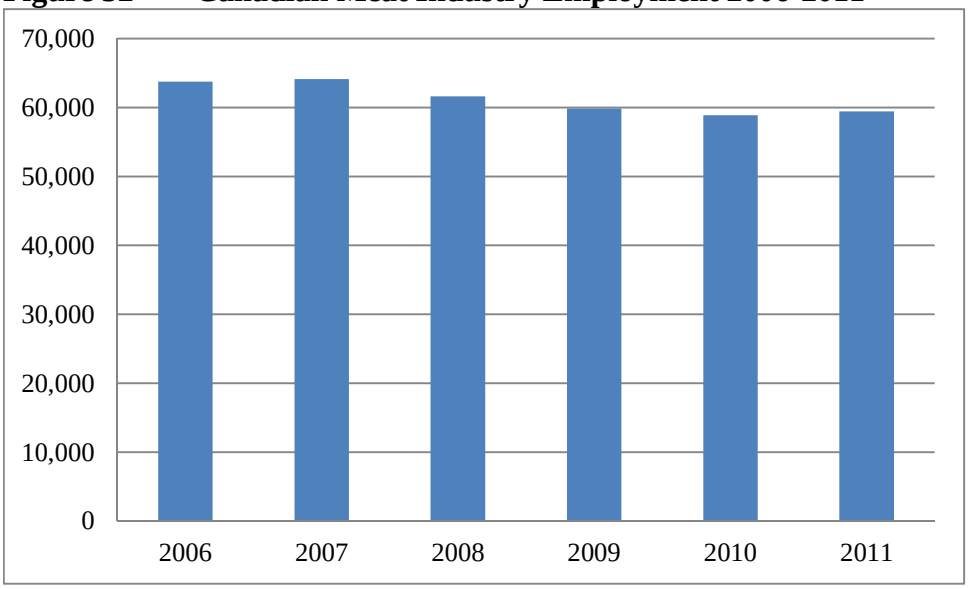
The Canadian red meat industry sales have been stable to growing over the past six years (Figure 31). The sales data do not include poultry sales. The employment in Canadian meat industry, including poultry has been declining, but the decline has been relatively modest (Figure 32).

Figure 31 Canadian Red Meat Industry Sales 2006-2011



Source: Statistics Canada Cansim

Figure 32 Canadian Meat Industry Employment 2006-2011



Source: Statistics Canada Cansim

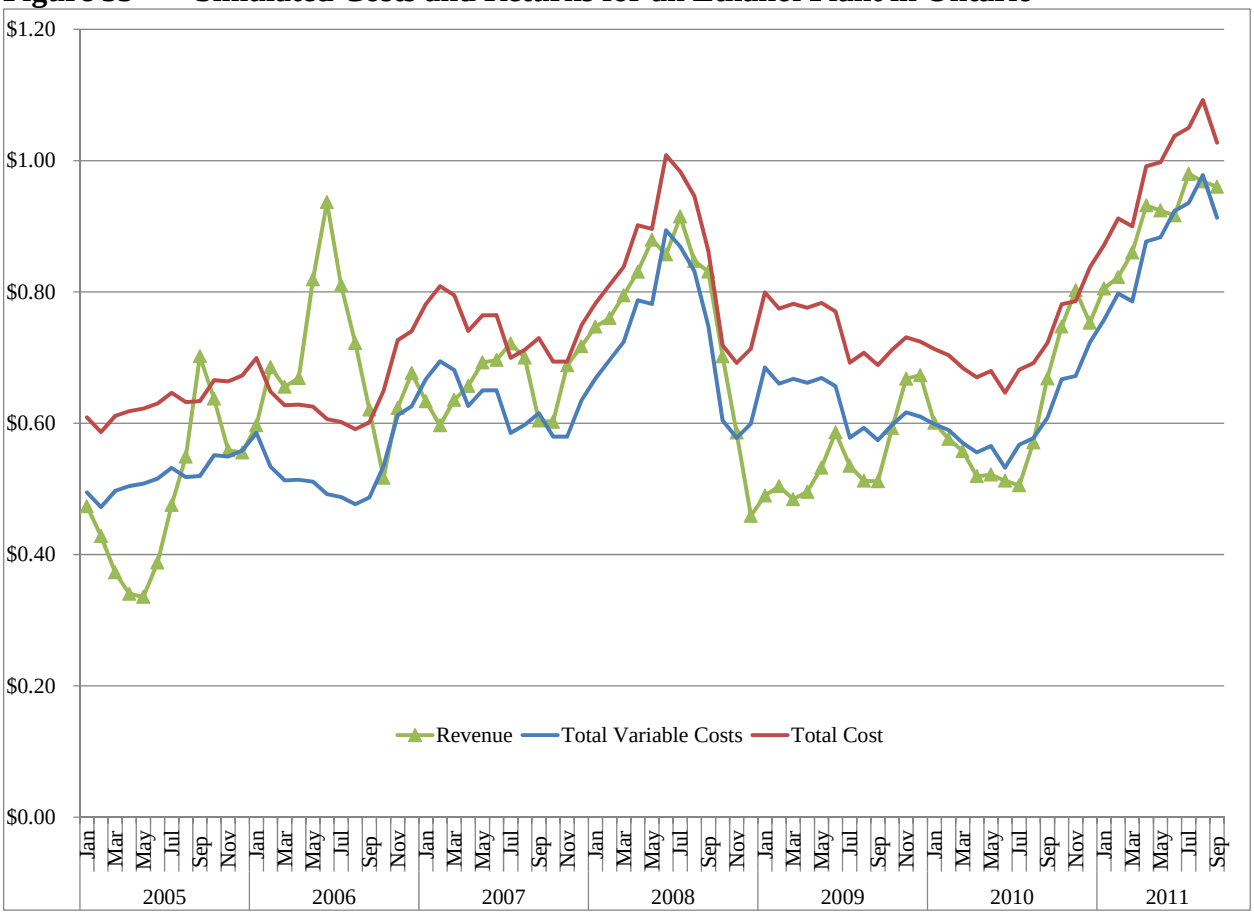
7.3 Ethanol Plant Dynamics

This section of the report provides a brief examination of the profit and loss dynamics of the Canadian ethanol industry.

Figure 33 below presents simulated costs and returns for an ethanol plant in Ontario based on corn. The capacity of the plant is 189 million litres and it is assumed to operate at 80% capacity. The revenue to the stylized plant is based on an ethanol yield of 10.4 litres ethanol/bushel and

8.2 kg/bushel of DDG; no plant or operating subsidies are included. The results in the figure show the following. The ethanol plant is broadly unprofitable. There are brief periods, notably in 2006, when ethanol revenues exceed total costs- but apart from this, the plant operates at a loss. The ethanol plant also struggles to cover even operating costs. Indeed, through much of 2009 and 2010, revenue was less than variable costs.

Figure 33 Simulated Costs and Returns for an Ethanol Plant in Ontario



These observations are not surprising, and indeed they represent the counterfactual. Ethanol plants receive capital and operating subsidies precisely because they would otherwise operate in a loss situation. It is of note that on a monthly basis, plant returns fluctuate to give a positive or negative contribution margin; this is not unlike a meat packing plant which also sees returns fluctuate on a monthly basis (or weekly basis) from positive to negative returns. The key difference is that ethanol plants are recipients of significant capital and operating subsidies; meat packing plants are not.

7.4 Summary

Despite the challenges and difficulties that the beef and pork industries have experienced over the past several years, the industry is growing and remains the largest sector in the Canadian food industry. In contrast, the ethanol industry is dependent on government subsidies in order to exist and to carry on operations.

8.0 Impact Summary and Implications

The ethanol industry has become a major user of grains in Canada. This has not occurred in a vacuum. It is generating consequences that could be predicted by basic economics. That is, ethanol production results in a subsidized stimulant to local Canadian grain demand that generates higher local prices than would have otherwise been the case. Due to government policy, the ethanol industry has an advantage in the competition for feed grains relative to other buyers, such as the livestock industry. As a result, ethanol policy has had impacts on the Canadian grain markets and on other users of grain, such as the Canadian livestock and meat industry.

The data and empirical analysis back up the theory and common sense assertions of the impact of ethanol on livestock production in Canada. The data show the following:

- Canadian ethanol production increases the price of feed grains in eastern and western Canada by about $15-20/tonne and $5-10/tonne respectively.
- Canadian ethanol production resulted in reduction in livestock feeding margins and or increased losses for Canadian producers.
- Canadian ethanol production resulted in lower feeder livestock prices for Canadian producers.
- Canadian ethanol production resulted in increased exports of feeder animals that could have been fed by Canadian producers.
- Canadian ethanol production resulted in reduced incentives for livestock production in Canada.
- Expanded use of ethanol will result in a serious reduction in feed availability in eastern Canada. This will result in a dramatic reduction of cattle and hog feeding in eastern Canada.

The bottom line is that ethanol has already contributed to the downsizing of the Canadian livestock industry through its impact on margins and livestock prices. Expansion of the industry will amplify the negative consequences.

Arguments can be made that given the wide price spread or relatively lower grain prices in Ontario and the West during 2010 and 2011, that ethanol is not a threat to livestock. This argument, however, is simply based on a fortuitous increase in production relative to demand in Canada compared to the US. Furthermore, even in these circumstances, the data and economic theory still demonstrate a negative livestock impact.

It is important to once again emphasize that the strengthening in the grain basis due to Canadian ethanol policy, rather than the world price of grain, is the driver of these developments. Ethanol policy in Canada, not the US policy, is having and will have far-reaching effects in terms of adjustments in the location of livestock feeding and meat production, and the associated economic development associated with them.

Looking to the future, it is crucial for the livestock and meat industry that the policies and programs sustaining the ethanol industry be curtailed or eliminated. Most importantly, it is critical to the livestock and meat industries in Canada that ethanol policy not further expand to mandate and support a 10% national blend. Governments must recognize the significance of the Canadian livestock and meat industry, and that it is vulnerable to expansions in ethanol policy.

Government has demonstrated that in a short time, it can create a large ethanol industry. The same cannot be said for the livestock and meat industry. Governments must realize that once the red meat industry develops over a long period of time; if it were to drastically decline or vanish, it would take a very long time to return.

Appendix A: Government Programs to Assist the Ethanol Industry

Federal Mandates and Subsidies

The federal government has created a Renewable Fuels Strategy in 2007 to support the development of renewable fuels in Canada. Canadian Renewable Fuels Association (CRFA) says that "regulatory tools are critical to the success of this approach. The Renewable Fuels Regulations have proven to be a crucial initiative." The objective of these regulations is to mandate an average 5% renewable fuel content based on the gasoline volume. The federal Renewable Fuels Strategy also includes a number of important incentive programs, as listed by the CRFA in the report "Growing Beyond Oil":

1. The ecoENERGY for Biofuels Initiative will invest up to $1.5 billion over 9 years to boost Canada's production of renewable fuels. This initiative provides operating incentives to producers of renewable fuels based on production levels and other factors. It makes investment in production facilities more attractive by partially offsetting the risk associated with fluctuating feedstock and fuel prices. The program has received more applications than it is capable of funding.

2. The ecoAGRICULTURE Biofuels Capital Initiative (ecoABC) is providing $200 million in repayable contributions of up to $25 million per project to help farmers raise the capital necessary for the construction or expansion of biofuels production facilities.

3. Accelerating the commercialization of new technologies. A Sustainable Development Technology Canada (SDTC) initiative provides $500 million over eight years to leverage private sector investment in establishing first-of-kind commercial facilities for the production of next-generation renewable fuels.

Provincial Mandates and Subsidies

The CRFA notes that Canada has a number of provincial renewable fuel mandates. Four provinces that collectively account for roughly 60% of all the retail sales of gasoline in Canada have ethanol mandates. These include a 7.5% mandate in Saskatchewan, 8.5% mandate in Manitoba and 5% mandates in British Columbia and Ontario. Alberta has a program that will start in 2011 and Quebec is targeting a 5% renewable fuel content in its gasoline pool for 2012. BC and Manitoba have implemented biodiesel mandates and Alberta has a program scheduled to start in 2011.

<u>Alberta</u>
In 2006, the province announced a nine-point bioenergy plan, followed in 2008, by the Alberta Energy Strategy. Certain programs which end in 2011 have supported bioenergy projects with grants totaling approximately $150 million. Another program, the $75 million Bioenergy Producer Credit Program (PCP) runs to 2016. This program focuses on the potential for second generation ethanol, which uses feedstocks like forestry, agricultural and municipal waste.

Saskatchewan
Saskatchewan's "Go Green" strategy includes developing E85 (fuel blends with 85% ethanol and 15% gasoline), developing a 1.4 billion litre biofuels industry in Saskatchewan. Programs include SaskBio: An $80 million loan program that encourages investment ownership in biofuels facilities.

Manitoba
Manitoba has various incentives to promote the development of its biofuels industries. Programs include direct producer grants for ethanol produced in Manitoba.

Ontario
Ontario accounts for 66% of Canada's ethanol production capacity. The province's ethanol strategy was comprised of two components: a renewable fuels standard and the Ontario Ethanol Growth Fund ("OEGF", announced in 2005). The OEGF program provides for both capital and operating grant support. The operating support is variable, based on prevailing commodity values for crude oil, ethanol, and corn.

Quebec
Quebec's focus is on the development of cellulosic ethanol. Enerkem and GreenField Ethanol have formed a consortium to construct a 'waste-to-ethanol' thermochemical plant to be integrated with GreenField's fi rst generation grain ethanol plant at Varennes, Quebec. Programs include a 2008 refundable tax credit for ethanol producers for use in Quebec. It began April, 2006 and expires in 2018, and a Green Technologies Demonstration Program which funds greenhouse gas reduction technologies.

Atlantic Canada
Some pulp and forest product companies are exploring the integrated biorefinery approach and/or direct cellulose-to-ethanol production. Governments and the private sector are evaluating biomass availability and bioenergy technologies available to the forestry sector.
Nova Scotia is the only province to include a tax credit on biodiesel.
(Source: Growing Beyond Oil, November 2010, Canadian Renewable Fuels Association)

A further summation of all the federal and provincial subsidies, tax credits and mandates can be found at the Conference Board of Canada website. In particular the November 2011 study entitled "Ethanol's Potential Contribution to Canada's Transportation Sector can be referenced at: http://www.conferenceboard.ca/documents.aspx?did=4511